

MAY 28, 1942

The IRON AGE

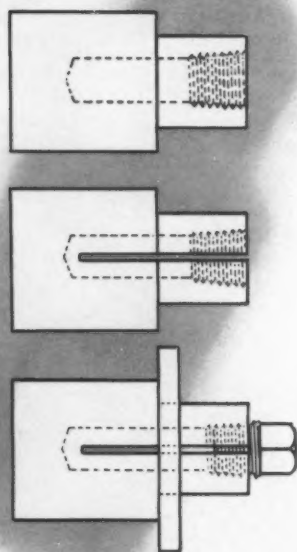


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Idea for **VICTORY**

...from the Production Lines
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FASTER, FOR LESS...WITH A WARNER & SWASEY**

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Turret Lathes

Cleveland

MAY 28, 1942

VOL. 149, NO. 22



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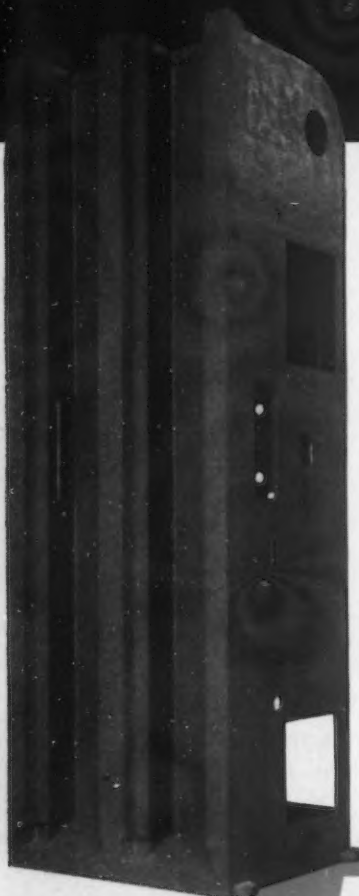
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THE IRON AGE

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MAY 28, 1942

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ESTABLISHED 1855



Incentives for Production

INCENTIVE systems for paying labor on the basis of output were born about 20 years ahead of the times. They remain, a few of them, here and there, but by and large most of them died in infancy due to the ignorance and abuse of their parents.

Take piece work as an example. Today most unions regard it as a means of labor exploitation and act towards it accordingly. It is not the fault of the system, per se, but of its mishandling. Managers of 20 years ago did not have the advantage of time study, motion study, job analysis and job evaluation. Piece work rates were established on records of past performance instead of actual possibilities. Then, when under the new system a worker earned three times his previous weekly wage, the rates were promptly reduced.

The result of this misfeasance on the part of management is that today labor is most generally paid for time put in, whereas capital and management are paid for results, or work put out. This basic and fundamental difference in interest, I believe, has been largely responsible for the widening cleavage during the past decade of those who should have been mutual partners in enterprise.

Today, with our general system of paying labor for time put in and not for work put out, it is possible to enlist labor cooperation in speeding up war output principally for two reasons. One is the patriotic motive, for labor is essentially patriotic and wants to help win this war. The other is the realization by labor that in turning out munitions of war in huge quantities, products which cannot be used in normal times of peace, labor is not building marketable surpluses of products which can compete with it for jobs after the war.

Both of these reasons or inducements for more output per man are ephemeral. Once the war stops, their appeal ceases. And if we are to have true cost reduction, it must come through giving labor a permanent incentive toward that end.

To find the answer to this part of the problem, management, I believe, must set up two directives. One is to work out a beneficial formula for the division of the fruits of cost reduction between capital, labor and the public with respect to profits, wages and prices. The other is to use the pulmotor of scientific job analysis which is now available, to recussitate the smothered child, pay incentive, so that labor, like capital and like management, will be rewarded by the measure of work put out rather than by time put in.

Unless management makes a determined start in solving these problems, we cannot expect to develop the full measure of purchasing power needed to finance consumption in a new after-the-war America.

J. H. Van Dusen

100,000 more freight cars *without cost*

NEEDED FOR THE WAR PROGRAM ★ POSSIBLE WITH YOUR HELP

FIVE percent more effective utilization of freight cars now in service would be equivalent to the addition of approximately 100,000 new cars. Ten percent more efficient use would be equivalent to adding 200,000 new cars.

As America's war effort gains momentum, the railroad burden grows heavier and heavier. New rolling stock is being built to help meet this demand, but better use of the freight cars already in service will avoid transportation bottlenecks *now*.

While a freight car is moving in trains less than two days on an average trip, it is in the hands of shippers or consignees several more days being loaded or unloaded, or in railroad yards and terminals. Every day—every hour of car detention time that can be saved is a boost to the war program. Ordering only the kind and number of freight cars actually needed, and loading them to capacity in the quickest possible time, is just as important.

By careful planning, Inland Steel Co. has increased the average weight of outgoing carload shipments 10% and decreased the average car detention time 20%, thereby greatly reducing the number of freight cars required. Inland considers its freight car economy just as important to the war program as the steel it produces for rails and freight cars, and for ships, guns and ammunition.

Let's all help America by helping the railroads

INLAND STEEL CO. ★ CHICAGO, ILLINOIS

Drawing Dies for Airframe Stampings

By G. A. BREWER

Research Engineer, Lockheed Aircraft
Corp., Burbank, Cal.

INCREASED recognition of the military importance of aircraft in the past two years has placed demands upon the industry for airframes in unprecedented quantities. In an effort to meet this demand the attention of the aircraft industry was at once directed toward the possibility of applying automotive stamping practices to the manufacture of airframe parts. The general principles involved in such applications have been thoroughly discussed,¹ but here will be considered the specific and all-important subject of low cost tooling for aircraft stamping work.

In spite of early-day beliefs to the contrary, similarities in detail between airframes and automobile bodies, do exist. Both are made principally of sheet metal formed to developable and non-developable surfaces. Both are joined by gas, electric, machine, and spot welding as well as by conventional fastening methods such as riveting and bolting. Except for size, the modern bomber fuselage is not unlike the modern automobile body. However, two factors must be considered before a ready adoption of automotive stamping practice to airframe components can be made. Aircraft, to be efficient, must be constructed of material that is light, strong and stiff. For present day airplanes, the various aluminum alloys such as 24S, 61S, 53S and 52S represent the most efficient structural material available. These aluminum alloys, in the harder tempers, have decidedly limited formability; and

... Automotive stamping practices are being applied to the manufacture of airframe parts. Tool steel or cast iron dies are not necessary—Kirk'site "A" die material performs efficiently on quite lengthy runs in the double-acting press.

even in the soft tempers they are by no means as formable as the deep drawing steel used for automobile bodies.

The most serious consideration of all, however, is not the limited formability of the aluminum alloys, but the enormous cost of tooling that would exist if aircraft dies were to be made of tool steel or high strength cast iron, following automotive practices. Upwards of 10,000 parts are required to make the frame of a modern bomber while but 1600 parts are necessary for the modern sedan body. Furthermore, the cost of the dies for the sedan can be spread over several hundred thousand units, whereas in the case of the bomber five times as many dies must be amortized over 2000 or 3000 units at the most. Furthermore, tryout runs and reworking must be reduced to a mini-

mum for airframe dies or the total cost rises tremendously.

This situation made it a traditional saying in the aircraft industry that: "We can't afford automotive-type tooling." However, such statements overlooked one major saving possibility. The very fact of relatively low production quantities in the aircraft industry permits the successful use of die materials of relatively limited life; materials that are easily cast, reclaimed, and machined. In this way the singularly effective *principles* of automotive tooling, such as drawing and stretching, can be utilized and the high cost avoided.

The economic and production advantages in using soft die materials for airframe stamping may be recognized in efforts both in this country² and abroad³ to use wood, zinc, aluminum, magnesium and plas-

THIS is the first of a series of four articles on IMPROVED AIRCRAFT FABRICATING TECHNIQUES developed by Lockheed Aircraft Corp. The three articles to follow deal with "Forming Contour Parts by Stretching"; "Forming Convex Flanges and Joggles"; and "Hydro-Press Forming with Rubber Platens."



FIG. 1—From the Kirksite "A" die shown in the foreground, 77 aluminum alloy parts were drawn.

FIG. 2—This closeup of Fig. 1 shows the Kirksite die after forming the 77 parts, and on either side of it are coordinate grids used to study the drawing action of the die.



tics as die materials. At the Lockheed and Vega aircraft plants, a system utilizing a photographic lofting technique in conjunction with plaster patterns and a proprietary zinc-aluminum die material known as "Kirksite "A" has been found to be highly efficient. This system produces satisfactory drawing and stretching dies with great savings in time and cost as compared to any system using cast iron or tool steel die materials, and has been found to involve time and cost advantages over the use of wood as a die material.

An outline of the photo loft-plaster pattern Kirksite die system is as follows: (1) The loft board is photographed on overlapping glass



— A —

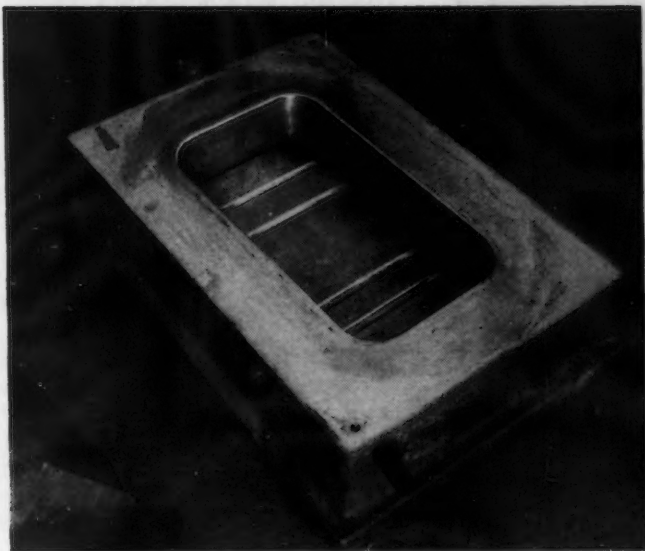


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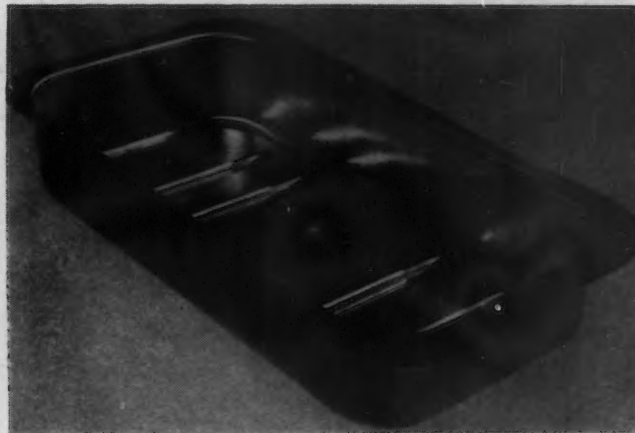


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FIG. 3—This Kirksite die (a) has been used in drawing 3685 parts like that shown in (b), which is a 2x5 3/4-in. deep box of 0.040-in., 24SO Alclad stock. A closeup (c) of the die is also shown.



— A —



— B —



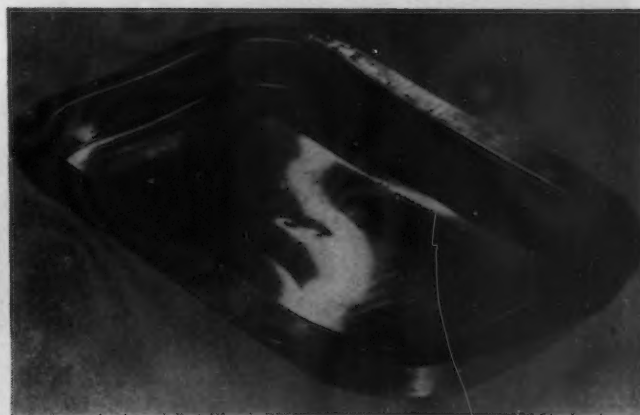
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negatives; (2) the desired section is projected on the sensitized metal surface, enlarged sufficiently to allow for the Kirksite shrink scale; (3) the exposed metal blank is developed; (4) templates are cut out of the metal blank using the photographic lines; (5) templates are mounted on a board and supported by wire framework; (6) plaster is poured into the framework to within about $\frac{1}{4}$ in. of the top of the templates and allowed to dry; (7) the finish coat of plaster is applied, and the shrink-mockup of the portion of the ship is complete; (8) plaster "splashes" are then taken

FIG. 4—This die (a), also of Kirksite, was used in drawing 278 parts like that shown in (b). These parts are 18x10x3 $\frac{1}{2}$ -in. boxes, made of 0.051-in. thick, 2450 Alclad material. A closeup (c) of the die is shown after drawing the parts.



— A —



— B —



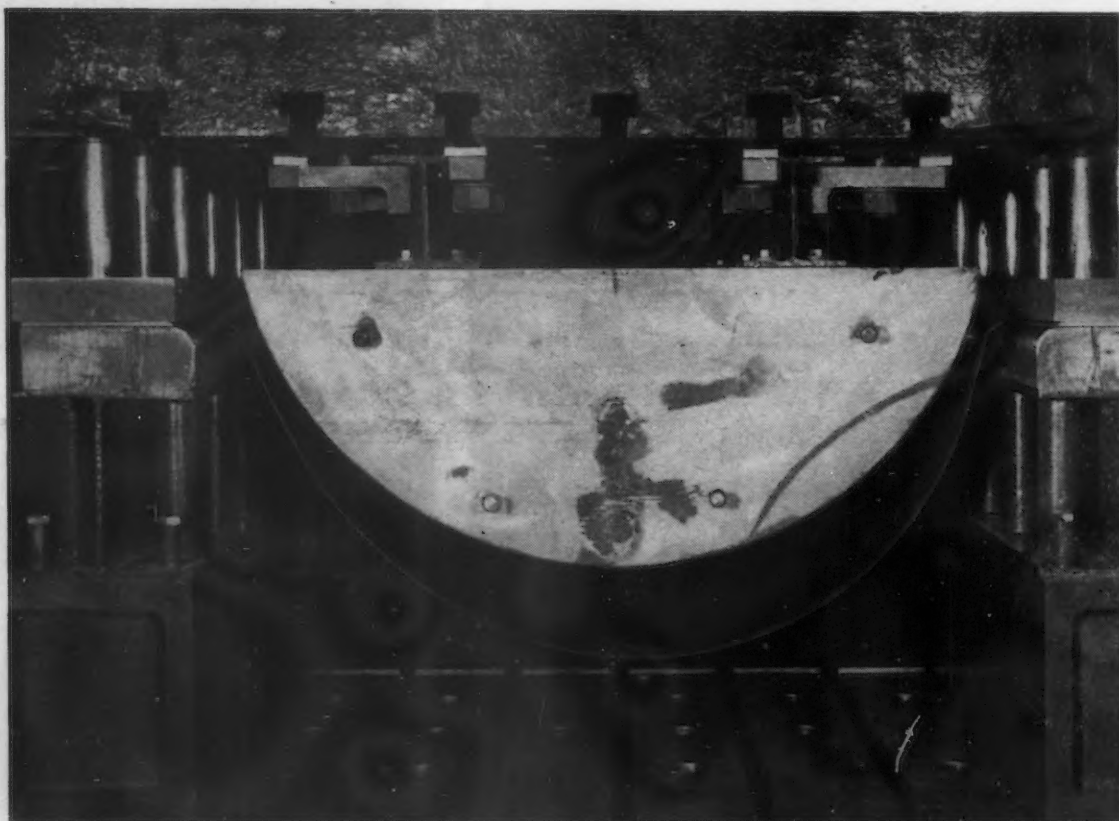
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FIG. 5—After drawing 500 parts, this Kirksite die (a) showed no appreciable wear (c). The parts drawn (b) were aircraft window frames, 19x13x2 $\frac{1}{4}$ in. deep, and are 0.040-in., 2450 Alclad stock.



ABOVE
FIG. 6—This large aluminum alloy convex skin section was drawn on a double acting Kirksite "A" die. This die is shown on the press bed in the background, with the hold-down ring and punch poised above it.

RIGHT
FIG. 7—A stretch punch of Kirksite and the 24ST aluminum alloy skin mounted in the double acting press.



from any portion of the mockup to be used for making sand molds for cast dies; (9) sand molds are made from plaster "splashes"; (10) Kirksite "A" is poured into the sand molds and allowed to solidify; (11) the finished die then is ground to size. The inherent speed in the process is due entirely to the fact that no laborious calculations or drafting are necessary once the original lofting work has been completed.

Kirksite is easily machined and, by casting the die almost to size, little machining other than finish grinding is required. Because of its low melting temperature, shown in Table I, Kirksite is readily reclaimed and foundry technique is simplified. The larger aircraft concerns already are equipped with Kirksite foundries as it is regularly used as a drop hammer die material.

One of the most cogent arguments advanced against the replacement of the drop hammer by the double-acting press for forming aircraft parts has been that the economies of using Kirksite as a die material must necessarily be lost in any conversion to the double-acting press, since the use of the latter was commonly supposed to involve a die material of tool steel or high strength cast iron.

It seemed logical to assume, however, that since Kirksite success-

FIG. 8—This production run of 24ST Alclad nacelle skins was stretched on a Kirksite punch on a double acting press. The depth of contour may be judged from the straight line drawn on the surface of the stack of skins to the left.



fully withstood countless impacts on the drop hammer, it could hardly be ignored as a possible die material for use in the relatively shockless double acting press. Accordingly, the research department at Lockheed Aircraft Corp. made a 12-in. cupping die and drew a number of parts on it, making frequent examinations of the surfaces of both the parts and the die. After some 77 parts had been drawn the surface of the die showed no evidences of deleterious wear, and the drawing radius appeared to be more highly polished than in the beginning, as illustrated in Figs. 1 and 2. It was concluded that the die would last for several hundred more parts and recommendations were made to try Kirksite as a drawing die material on a small scale in actual production.

In the six months following this recommendation, over 150 Kirksite double-acting dies, exclusive of a large number of double-acting dies converted directly from drop hammer dies, have been constructed and have passed tryout tests. The largest run to date has been that of 3685 boxes, drawn on the die shown in Fig. 3. To date only a few hundred parts have been drawn on other dies, shown in Figs. 4 and 5, but no signs of deleterious wear are yet visible. It is of interest to note

the successful use of this material on drawing dies of the comparatively large size in Fig. 6.

Although the harder tempers of the aircraft aluminum alloys, such as 24ST, heat treated Alclad, cannot be readily drawn, they can be stretched to a useful degree. Fig. 7 illustrates the use of Kirksite as a stretching punch on a large double-acting press. No bottoming die is used, the sheet being clamped to supporting rails by the hold-down ram. The contoured nacelle skins stretched from 24ST material on a typical run are shown in Fig. 8. These were made at the rate of 90 per hr., and the time saving as compared to laborious drop-hammer formation is obvious.

The successful use of Kirksite as a draw die material at Lockheed and Vega plants have virtually eliminated the use of high strength cast iron or tool steel except in

cases involving unusually severe conditions or extremely long runs. In such cases where it is planned to use a harder material for the final die, it is often found advisable first to make the die in Kirksite so that any modifications necessary for successful operation can hardly be made in the soft material. Then after the successful tryout the die may finally be made of the harder material with little risk of failure.

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- ² "Aircraft Stampings," by Peter F. Rossman, *Modern Industrial Press*, Jan. 18, 1942, p. 18.
- ³ "Pressings in Airplane Construction," by E. J. Ritter, *Aircraft Engineering*, Feb. 1941, pp. 47 and 48.
- ⁴ "Vega Applies Cast Dies," by James A. Harris, *American Machinist*, Jan. 8, 1942.

TABLE I
Comparison of Physical Properties of Kirksite and Cast Iron

Material:	Melting Temperature, Deg. F.	Brinnell Hardness	Ultimate Compression Strength, Lb. Per Sq. In.
Kirksite "A"	717	107	60,000 to 75,000
Gray Iron	2000	130 to 210	65,000 to 160,000
High strength cast iron	2100	200 to 350	.....

Plaster Patterns for the F

PLASTER patterns constitute one of the most revolutionary changes in foundry practice during the last half century, affecting not only the present day pattern maker, but also foundry technique. By this method castings can be produced in half and even one-fifth of the time previously taken.

Naturally a number of foundrymen regard a pattern solely as an object to be reproduced in metal, and therefore whether it be made in wood, plaster or metal is a matter of little importance. But the aim of most progressive people is some day to run a department on their own initiative. Then the question of cost and time lag becomes of vital importance, and the pattern plays no small part in controlling both cost, and what is more vital now, time.

In using wood, several pieces invariably have to be joined together in such a way that glue must be used. Glue takes several hours to harden. Here is delay—although in this case unavoidable.

Wood has a great tendency to warp and twist either when left in the damp sand or in the sun. On large surfaces the joints are sometimes left $\frac{1}{8}$ in. or even $\frac{1}{4}$ in. apart to allow for this movement; while plaster, once cast and dried, shows very little movement, so that even large surfaces can be made in one piece without showing any trace of joints.

It may be advisable to point out here that a piece of plaster 4 or 5 ft. long and in its green state (that is just after being cast and still damp) will, if not properly supported, sag as much as $1\frac{1}{2}$ in.

Advantage may be taken of this when allowing for camber; in this case the pattern is "run" quite straight, then both ends are lifted

onto supports at the required height, or a saddle may be used to give the desired sweep. Plaster when thoroughly dry, however, retains its shape.

Plaster of Paris, owing to its natural quick-setting properties, and also to its property of reproducing perfectly any surface or shape, appears to be the most suit-

stone. The addition of 10 per cent finely pulverized marshmallow has the same effect.

Materials Available

A proprietary brand of plaster just recently placed on the (British) market, when dry, has a compressive strength of 17,000 lb. per sq. in., compared with concrete of 8500 lb. per sq. in., after 12 months; a tensile strength of 1300 lb. per sq. in. and a Brinell of 35. Here, then, is an ideal material** for plate patterns, or for patterns for repetitive work. In the case of only six off being required, the plaster used in its natural state, reinforced with canvas, is quite satisfactory.

*** Several gypsum plasters are available in the United States with tensile strengths and hardness qualities substantially above ordinary plaster, as, for example, Best Bros., Keene's Cement and Hydrocal.—Ed.*

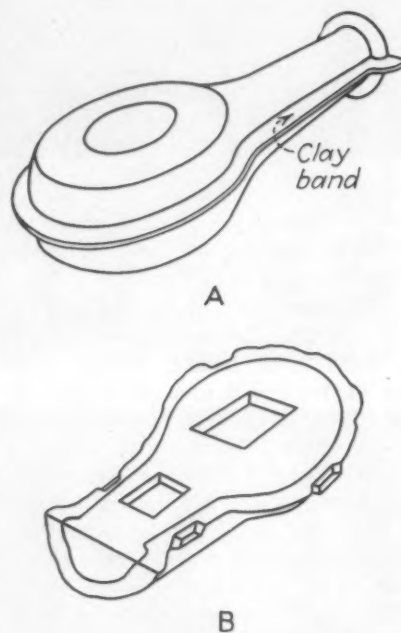


FIG. 1—Plaster mold (A) for broken connecting rod. This job can also be made up by use of a split pattern (B).

able material. A very reliable plaster known as "Italian fine" (a pottery plaster might also be used—Ed.), is obtainable at most large building supply warehouses.

This material can be controlled at will. By the addition of a little alum in the form of a saturated solution, it can be made to set in 3 min., while a little size water will retard the setting for 20 min., 1 hr. or even 2 hr.; in fact, 1 lb. of glue to 7 qt. of water will retard the plaster for about 12 hr., which when set, will be so hard that it can be turned and polished like

The most suitable consistency for mixed plaster is obtained by adding about 2 lb. of plaster to 1 pint of water. The best method of mixing is to sprinkle the plaster on the surface of the water, allowing it to filter through the fingers to avoid any lumps entering the water. Continue quickly until the plaster appears in a little mound and the water is almost all taken up, then stir quickly, keeping the spoon on the bottom of the bowl to prevent air being beaten in and causing bubbles. This gives a good set with little or no expansion. Extra water should not be added to the gage, as this results in a weak plaster. On the other hand, if gaged too stiffly by adding more powder than the water will readily take, the plaster will set quickly, with a tendency to warp, twist or expand during setting, while generating considerable heat.

Scrim*** is a coarse canvas used for reinforcing plaster, and can be obtained from rope and twine makers in a variety of meshes—

* An abstract of a paper presented before the Wales and Monmouth Chapters of the Institute of British Foundrymen, and originally published in the FOUNDRY TRADE JOURNAL.

Foundry

By H. PLUCKNETT

the most suitable being $\frac{1}{8}$ in. square and $\frac{1}{4}$ in. square; both of these grades have their uses for reinforcing. With the open mesh the plaster is easily worked in, but on the finer and stronger canvas a

*** Coarse texture material resembling fly screening. It is somewhat similar to cheese cloth, but much heavier.—Ed.

brush should always be used, otherwise air pockets between the surface skin and the canvas are sure to appear.

Plaster is handled in exactly the same way as for decorative architectural work. In fact, all the art of the old-time plaster craftsman is brought into use, including running and double-running, turning and double-turning (wheel), which is very similar to struck work and sweeps in loam molding. Owing to the present day form of architecture there is very little call for these various methods and difficulty may be experienced in finding a craftsman, as few apprentices now are initiated into this work.

Besides knowing how to handle plaster, a good knowledge of foundry work is, of course, essential to enable the plaster worker to allow for loose pieces, cores and draw-backs correctly. The ordinary patternmaker, however, after one or two attempts will find plaster can save hours of tedious work; for instance, a broken connecting rod or flywheel is brought in for casting and a new pattern must be obtained. What could be simpler than to make a plaster mold of the broken pieces (placed or fixed together temporarily) and then a plaster replica? The slight alteration in form and size required for shrinkage and machinery purposes takes but very little time as compared with woodwork.

Broken Connecting Rod

To make a mold of a broken connecting rod, the procedure is roughly as follows: Having assembled

... Use of plaster of Paris for foundry patterns reduces production time by one-fifth to one-half, the author of this article claims. Several examples of the use of this medium are described.*

the broken parts, which may be wired and tied together, the missing pieces are made good with clay or plaster and the bearing cavity filled in the same way. A line corresponding to the center of the connecting rod is then marked around and a band of clay 1 in. wide and $\frac{1}{2}$ in. thick is put around as shown in Fig. 1. This half is greased and $\frac{1}{4}$ in. of plaster laid over.

Another mix of plaster is made and this is splashed over the first

other half made in exactly the same way as the previous one. When set the two halves may be removed, shellacked and greased, then tied together and filled with plaster. If preferred, a split pattern may be made by filling one half of the mold first—that is, before tying up. This is leveled off and two joggles made as shown in Fig. 1 (B). When shellacked and greased, the second half of the mold is put on top, the two halves tied together and the

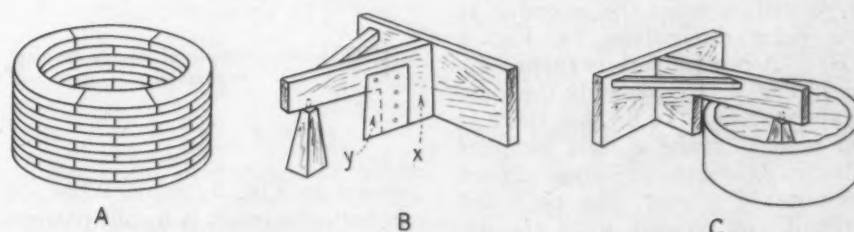
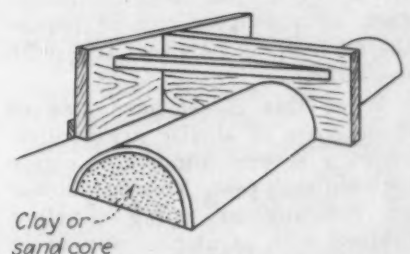
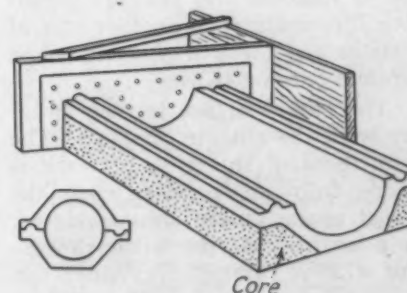


FIG. 2—Molding a 20-in. cylinder: (A) The usual wood pattern; (B) template used in making a plaster pattern; (C) making the center core in plaster.

FIG. 3—Patterns for a 3-ft cylinder. Top sketch is the template, while below is the core box.



coat and the two mixings blended together with a brush. One or two layers of canvas are spread over and the plaster laid on until a uniform thickness of $\frac{3}{4}$ in. has been obtained. Within 10 min. or so the job may be turned over, the clay removed, the plaster joint trimmed and two or three joggles cut in the plaster with a knife. The edge is then shellacked and greased and the



other half of the pattern poured against the first part.

Making a 20-in. Cylinder

Where repairs and replacements of national importance are concerned, days and even weeks can be saved by this method; no matter how complicated the casting, plaster will reproduce it as quickly as it would a plain surface. Consider the work entailed in making a wood pattern for a cylinder, 20 in. o.d. with 2 in. thick walls and 9 in. high, such as is shown in Fig. 2 (A). This is constructed out of some 54 pieces of wood glued and pegged together.

Each segment is cut from a square of timber some $10\frac{1}{2}$ in. square and $1\frac{1}{8}$ in. thick. There are six of these pieces to form one ring an inch thick, and nine such rings must be jointed up to make the cylinder so that 216 faces must be trued up. Then the rings should be pegged together to embrace all the segments; after all this jointing, preparing and glueing, the whole job must be laid aside for the glue to harden, after which it is turned in a lathe.

How would this be produced in plaster? This is an example of double-running, and, first of all, two templates are made, both being outside sweeps. One is the inside diameter (y, Fig. 2 (B)), shown on a loose plate, while the second is to the outer dimensions (x, Fig. 2 (B)). A central core is turned up, as in Fig. 4 (C), showing the loose plate removed. To do this there is no need to make a solid lump of plaster, so lengths of canvas, dipped into mixed plaster, can be coiled around, coil on coil, until the desired height has been obtained; then with another mix of plaster the surface can be swept true with the strickle.

When this is set hard, two or three coats of shellac are applied, allowing several minutes to elapse between each coat. This is followed by greasing or oiling — tallow thinned with paraffin or any sweet oil will serve. Then $\frac{1}{4}$ in. of plaster is splashed over the core, covering this again with another mix of plaster and a length of scrim bound around once or twice.

The outer surface is then swept up with the outside template. The directness of this type of work is more fully appreciated when the great enemy "time" is considered, and in this case the whole process for a 20-in. diameter cylinder can be carried out in a matter of 5 or

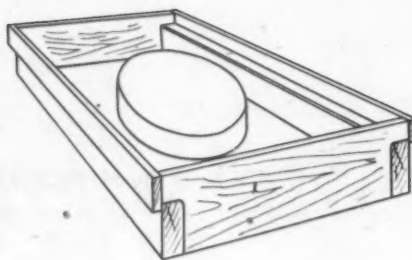


FIG. 4—Setup for making a drop hammer tool for a 3-ft. brake drum.

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6 hr. As soon as set hard the pattern can go straight into the foundry, where there would be little difficulty in producing a cast the same day if necessary.

Now suppose this cylinder were 3 ft. long and 20 in. in diameter, then all that would be required is a half-circular template and a length 6 ft. long run on the bench, as

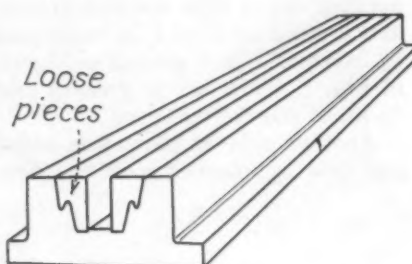


FIG. 5—An example of double running in plaster.

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shown in Fig. 3 (top). When cut in half, the result is a split pattern, involving 4 or 5 hr. work. Metal dowels can easily be inserted or plaster joggles can be cast on. The prints can be run the same way or swept up on a central pin as the 9 in. high cylinder.

As for the corebox, this is just

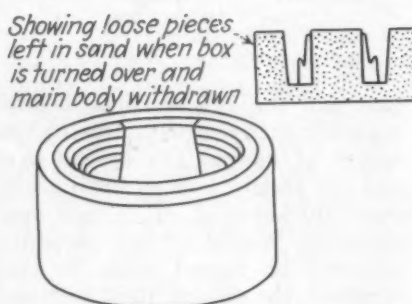


FIG. 6—Double turning a cylinder.

another simple straight run, as is shown in Fig. 3 (bottom). These runnings can be made as much as 5 or 6 ft. across, and of whatever length required.

Clay Coring

For larger runnings, from 6 in. upwards in circumference, the system of clay coring has been introduced, as this saves weight and plaster. The procedure is as follows: Two templates are made, one to the finished line, while the other is $\frac{3}{8}$ in. under the size required. Using the smaller template, a uniform body is built either of wood, clay, or sand, then covered with wet paper. Over this core a length of scrim, dipped into a bowl of plaster, is placed and while the plaster is still fluid, the larger template is passed over the whole, as shown in Fig. 3. It may be necessary to run the strickle over the plaster several times before the correct form is achieved, and perhaps another mixing of plaster; this second mixing of plaster will readily adhere to the first mix—it is sometimes much simpler to allow for two or three mixings.

Where large patterns in plaster are mentioned, the question of weight naturally arises. Take, for example, a 2-ft. cube; one would probably think it would weigh 100 or 200 lb., but this is not the case. There is no need to waste good material in such a manner; all that is required is five squares of plaster $\frac{3}{8}$ in. thick, reinforced with one or two layers of canvas. One piece is placed flat on the bench, while the other four are placed around and kept upright and square with bricks or iron weights. Then the joints are covered with canvas dipped in plaster.

There is no jointing or mitering, as in woodwork: in fact, gaps of $\frac{1}{4}$ in. wide are usually aimed for, as it is easier to fill in an open crevice than a small one, and, what is more, it is stronger. To do this filling, plaster is poured into the gap or channel and simply levelled off with a scraper when almost set.

Solid plaster will easily break if given a sharp blow, but a hollow cast approximately $\frac{5}{8}$ in. thick, and reinforced with canvas and strips of wood or builder's laths, can be dropped on the floor with no more damage than a chip off here and there, which a competent molder in the foundry can easily make good.

Patterns from 6 in. to 6 ft. square are all made by this hollow

method, the inside being filled up with sand when being rammed up. Wire hooks or pieces of wood are inserted for withdrawing the patterns from the sand, and on a job 3 or 4 ft. square and 18 in. deep, a 2-in. by 1-in. batten will be found very convenient. When securely fixed by lengths of canvas dipped in plaster, these battens form good handles, and steel whips or wood screws can be inserted and the pattern hoisted out by the crane.

A pattern 4 ft. square and 18 in. deep made on these lines can easily be handled by one man, but, if made solid, it would weigh some 300 or 400 lb. Thus, not only is the work simplified, but a considerable amount of plaster is saved.

Light Castings

The system for making these light fibrous castings is very simple. Take, for example, the making of a drop hammer tool of a 3-ft. diameter brake drum. The outside of the pattern, if made in plaster or wood, is prepared with several coats of shellac, and then greased, whether it be in metal or otherwise. Then a wall of boards or metal is placed around the pattern, so forming the sides of the tool, as is shown in Fig. 4. Plaster is then laid on to an approximate average thickness of $\frac{1}{4}$ in.

Then another bowl of plaster is gaged, adding one or two tablespoons of size-water. This second mix is splashed all over the first $\frac{1}{4}$ in., and the two mixings blended together with a 3-in. or 4-in. brush. It is important that the second be applied before the first coat has properly set, otherwise the face may be left on the pattern.

Squares of canvas cut to a convenient size are laid in, either dry or they may be dipped into the bowl of plaster. Whichever method be employed, a brush must be used to bond the surfaces together—two layers of canvas being quite strong enough for anything up to 6 ft. square. If required, a third bowl of plaster may be mixed to thicken up the edges, and fix the battens, etc.

Rapping Patterns

Plaster patterns will not stand rapping to the same extent as wood. To overcome this drawback an entirely new method has been developed. By this system use is made of "slip" or "loose" pieces wherever straight or parallel sides are imperative, such as deep chan-

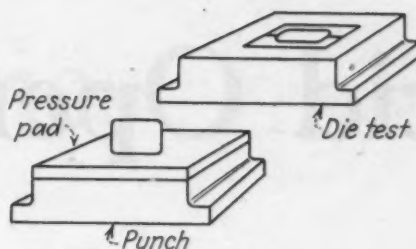


FIG. 7—Punch and die for a press tool.

nels, etc. Plaster lends itself to this system admirably, as can be seen by the examples of double-running (Fig. 5), the double turning cylinder (Fig. 6), and the example of a press tool (Fig. 7).

Before going any further, it would be well to clarify this principle. The press tool (Fig. 7) is a good example. There would be no



FIG. 8—Die for a press tool made with slip pieces.

difficulty in producing the punch, or the pressure plate, but the die does present some difficulty owing to the deep recess with parallel sides. But by incorporating slip-pieces the work is made quite straight forward, as can be seen by Fig. 8 showing the sand, with main body removed.

Again examining the cylinder

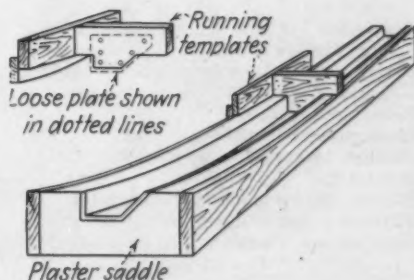


FIG. 9—Guttering with a plaster pattern.

(Fig. 6), in this case the inside has parallel sides, and under ordinary circumstances it would mean coring, but by making an extra template or loose plate the plaster pattern can easily be turned in two sections in such a way that when the box is rammed up and turned over, the main body of the pattern is removed leaving the slip pieces around the core. These are easily accessible, and being cut into three pieces, there is no difficulty in removing them—leaving the sand in perfect condition.

This method, therefore, saves the time and expense of making a core box, which is considerable on a cylinder of 20 in. diameter. It also speeds up foundry production methods considerably, owing to the fact that the making of a separate core has been eliminated.

The advantages of such a procedure can be readily appreciated, for instead of waiting for the core to dry out, this cylinder could be cast immediately in the green sand. The making of such pieces in wood would make the pattern very costly, as most of the fitting must be done by hand; whereas with plaster, one section is simply cast against another, ensuring a perfect fit.

Supposing such pieces were made in wood, there would inevitably be much trouble caused by warping and twisting due to climatic changes. When such slip pieces are employed, care must be exercised in giving the interior faces a protecting coating of shellac, as three coats of medium consistency add about 0.005 in., and on the two surfaces so treated there would be an addition of 0.010—which is quite sufficient to stop the pieces going back to the proper position.

Another interesting example of speed and simplicity is a pattern for guttering (Fig. 9). Here the camber is run to the predetermined sweep, giving the outside shape. The actual gutter pattern is then run off using the inside template. In this case, while the saddle is only a means of obtaining the outside shape and camber, it could very conveniently be used as an oddside with a considerable saving of time and labor.

An interesting discussion of plaster mixtures and shrinkage of such mixtures is contained in "Production of Copper Patterns by Electroforming", by A. K. Laukel; American Foundrymen's Association, preprint No. 42-35.—Ed. note.

Acid Open Hearth

THE acid open hearth furnace, although used for the production of some of the highest qualities of steel, seems to be the Cinderella of steel plant furnaces. It is generally small—usually less

than 80 tons capacity—and is constructed of much the same refractories as it was 40 years ago. Nor has there, until recently, been any great change in design. From the refractory standpoint, the one real

innovation has been the use of special chrome or chrome-magnesite brick in the ports.

Since the basic open hearth has already been discussed in considerable detail* and since the design of acid open hearth is, in most respects, similar, the present discussion will not be dealt with as intensively, except as regards the hearth making technique.

TABLE I

Brick Layout for an 80-Ton Acid Open Hearth Furnace, Cold Pig Charge, Water Cooled Ports and Doors, and Sloping Backwall

Section in Diagram*	Furnace Section	Material
1	Gas ends	Silica (first quality)
2	Gas uptakes	Silica (first quality)
3	Air ends	Silica (first quality)
4	Air uptakes	Silica (first quality)
5	Ramp roofs	Silica (first quality)
6	Main roof	Silica (first quality)
7	Bath bottom, sub-hearth, and monolithic hearth	Silica (first quality), medium alumina fireclay brick, and silica sand.
8	Bridge banks	Silica (first quality)
9	Branks	Silica (first quality)
10A	Gas port arch: Nose	Silica or special chrome
10B	Backing	Silica or ordinary chrome
10C	Wing walls	Silica (first quality)
12	Back walls	Silica (fettled with sand)
13	Front wall	Silica (first quality)
14	Doors	Medium alumina fireclay brick
15	Door arches	Silica (first quality)
16	Door jambs	Silica (first quality)
17	Gas slag arches	Silica (first quality)
18	Air slag arches	Silica (first quality)
19	Gas slag walls	Silica (first quality)
20	Air slag walls	Silica (first quality)
21	Slag wickets	Used silica bricks
22	Slag slopes	Silica (first quality)
23	Slag bottom paving	Silica (first quality)
24	Slag false walls	Silica (second quality)
25	Slag top paving and protection walls	Firebrick and red brick
26	Checker bridge walls	Silica (first quality)
27	Gas checker arches	Silica (first quality)
28	Air checker arches	Silica
29	Gas checker side walls	Silica, $\frac{1}{3}$ at top; semi-silica, $\frac{2}{3}$ at bottom; and H.T. and L.T. insulation
30	Air checker side walls	Silica, $\frac{1}{3}$ at top; semi-silica, $\frac{2}{3}$ at bottom; and H. T. and L. T. insulation
31	Checker front walls	Silica, $\frac{1}{3}$ at top; semi-silica, $\frac{2}{3}$ at bottom; and H.T. and L.T. insulation
32	Checker wickets	Semi-silica, used firebricks, and L.T. insulation
33	Checker bricks	Top, silica (second quality) or high alumina fireclay brick; Bottom, semi-silica or medium alumina fireclay brick
34	Checker false walls	Silica (second quality)
35	Checker bearers and bearer walls	Medium alumina fireclay bricks
36	Checker floors	Medium alumina fireclay bricks
37	Checker top paving	Red brick
38	Gas valve	Medium or low alumina fireclay brick
39	Air valve	Medium or low alumina fireclay brick
40	Flues	Medium or low alumina fireclay brick

*Figures correspond to those in the furnace diagrams shown in "Basic Open Hearth," by J. H. Chesters, THE IRON AGE, May 22, 1941, page 41.

*Articles that have appeared in THE IRON AGE by J. H. Chesters on steel plant refractories are: "All-Basic Open Hearth Furnace," Aug. 15 and 22, 1940; "Steel Plant Refractories," Feb. 6 and 13, 1941; "Basic Open Hearth Above Sill Level," May 22 and 29, 1941; "Basic Open Hearth," Aug. 7, 14, and 21, 1941. "Casting Pit Refractories," Nov. 20 and 27, 1941; and "Electric Steel Plant Refractories," March 5 and 12, 1942.

The refractories used in the acid open hearth are so similar for the various parts that, from a chemical point of view, the furnace would work equally well upside down. Indeed, it would be possible to build an acid open hearth furnace without using any refractories other than silica brick. Fireclay brick and, to a less extent, chrome brick, are used and Table I shows a typical lay-out, the nomenclature being that already specified in Fig. 3 of the basic open hearth article in THE IRON AGE, May 22, 1941. As far as the "above stage level" is concerned, it will be seen that medium alumina fireclay brick are used next to the hearth pan and in the doors, and in some furnaces chrome or chrome-magnesite brick are used in the ports. With these exceptions, the whole of the top of the furnace is constructed of first grade silica brick whose properties have already been discussed in connection with basic open hearth furnace roofs.

Below the stage the construction is essentially similar to that of basic open hearth furnaces, both as regards material and dimensions, though the checkers in an acid open hearth tend to behave very dif-

Refractories

By J. H. CHESTERS
Central Research Department,
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ferently from those in a basic furnace.

The Roof

Construction

There is no difference in construction between basic and acid open hearth furnaces except that the acid furnace tends to retain the old designs. Recent developments such as the Maerz and Venturi designs have been applied to the acid furnace and with good results. In the former, the roof is a section of a cylinder with a marked back to front camber but a fairly constant level from end to end, while with the Venturi design there are steep ramps and knuckles where these ramps join on to the main roof. In the Venturi roof, therefore, there is a curvature not only from back to front, but from end to end. The precautions already discussed in connection with basic furnaces, that is, the necessity for heating up the furnace on a carefully controlled schedule and of avoiding over-heating in the early stages before the roof has matured, apply equally well to the acid open hearth furnace.

Materials

Silica roof brick are bought in Great Britain to the same specifications for acid as for basic open hearth furnaces, though with furnaces of the United Steel Companies, Ltd., an even higher refractoriness is desirable for the acid than for the basic furnaces. It has been observed, particularly with the acid process, that a furnace

... Continuing a series of articles on open hearth and steel plant refractories, the author herein describes the acid open hearth, drawing a parallel between it and the basic furnace.

that takes an even glaze during the early stages of its life is more likely to give a long campaign, and for this reason glazing tests are carried out from time to time. The results of one such series of tests are shown in Fig. 1. It will be seen that under precisely similar heating conditions, some bricks show no sign of glazing, some glaze evenly, while others show a rough surface, due to the grog having remained solid while the matrix melted. The brick that shows this effect in Fig. 1 also showed it in practice, long stringers falling from the roof consisting of a mass of grog particles in a fluid matrix.

The problem of glazing is one that requires a great deal more study, but it can already be said that part of the difficulty lies in the fact that, whereas the grog grains consist of very pure silica (over 98 per cent), the matrix not only

contains the lime bond but also various easily ground impurities in the original rock, and is, therefore, likely to be less refractory. These limitations may possibly be overcome, at least in part, by the omission of the lime bond from the brick or by careful treatment in the early stages so that the original brick becomes replaced on the inner face by a continuous network of cristobalite crystals whose texture bears little relation to that of the original material.

Life and Causes of Failure

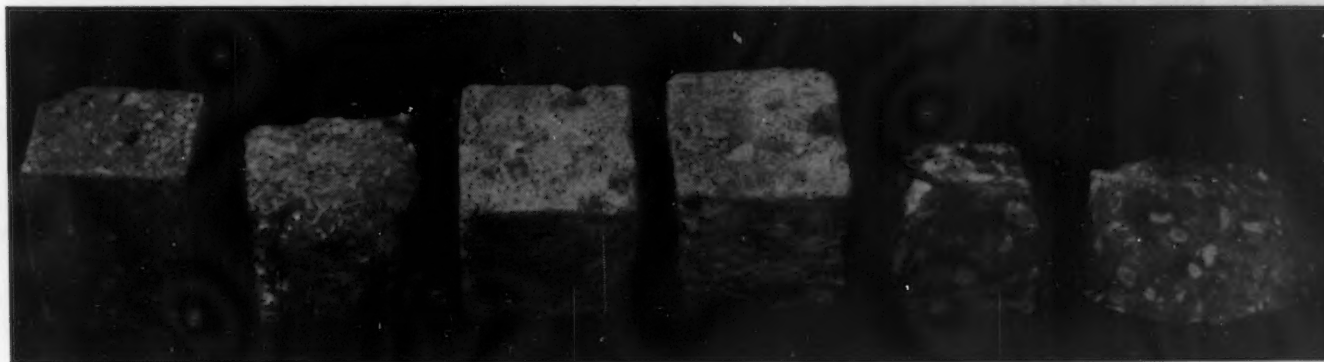
Larsen, Schroeder and co-workers have carried out a great deal of experimentation on the conditions existing in acid open hearth furnaces and have given a useful summary of the earlier work of Whiteley and Hallimond. Thus, they suggest from the latter's work that:

(1) The dust in the atmosphere is mainly derived from the metal both during the melting period and during the subsequent boils.

(2) The furnace atmosphere carries the heaviest burden of solids during the boiling period.

(3) By weighing checker brick before and after service, Whiteley

FIG. 1—Glazing tests on acid refractories. The condition of the silica brick after heating to 3074 deg. F. for 10 min. Left to right: Unglazed, fluid matrix, even glaze, even glaze, fluid matrix and slumped.



and Hallimond estimated that at least 18 tons of dust was deposited during 120 heats of 70 tons each, or an average of 300 lb. per heat.

(4) Under a microscope the dust particles from the air checkers appeared as tiny spheres from 1/300 in. downward in size, often fritted together to form clusters. The gas checker dust was similar in character but fritted to a much greater extent.

(5) The particles are present in the gases as liquid drops. In the melting stages, the suspended particles are no doubt due to the spitting of the metal as it fuses but the origin of the oxide when the molten metal is covered with slag is less certain. It may possibly be due to the presence of iron vapor in the numerous bubbles of carbon monoxide found throughout the boil, or more probably to the spurt- ing of the metal of the bath.

The marked difference between the acid and basic furnaces as regards chemical attack on the roof lies in the absence of dolomite and the relative absence of lime in the acid process. The life obtained with an acid roof varies greatly from furnace to furnace and from one plant to another. Thus, in one works a life of eight or nine weeks is considered excellent, whereas in another works, making fairly similar steel and only a matter of two miles distant, a life of at least one year is expected. The justification given for the extremely low lives is that excessively high temperatures are required if the cleanest steel is to be obtained, and that the excellent physical test data on the steel more than justify the extra refractories costs.

One peculiarity of acid roofs which has been noted in several plants is the step-wise fashion in which they wear. Whereas a basic roof will finish up with a remaining thickness varying gradually from perhaps 3 in. over the tap hole to 9 in. at either end, an acid roof may show a sudden transition from an area 3 in. thick to one of 9 or 10 in. thick. It would scarcely seem possible that the temperature can change appreciably in such a short distance unless flame deflection from heavy scrap is taking place. However, since the phenomenon has been observed not once but many times, and since it definitely appears to be associated with short life on roofs, it certainly requires further study.

The zoned structure of open hearth roof brick described in the

earlier articles on the basic open hearth furnace is also observed with acid open hearth furnaces. To the naked eye, the zones are similar but chemical analysis and microscopic studies reveal certain differences.

Table II shows a series of analyses taken from the Larsen and Schroeder paper. It will be seen that the main pick-up from the furnace atmosphere consists of iron oxide and that, with this particular roof, the ratio of FeO to Fe₂O₃ is somewhat higher than that corresponding to magnetite. Zone 1 not only shows no pick-up of lime, but it actually shows a considerable drop. In all probability the analysis of the original brick was similar to that of zone 4 (C and D), that is, the lime content was about 2 per cent, but it will be seen that this has migrated mainly into the third zone (B2) while the iron oxide, most of which has been picked up from the furnace atmosphere, shows a maximum concentration in zone 2 (B).

The concentration of alumina in the third zone is also in accordance with the author's experience. Summing up, it would appear that the lime and alumina present in the working face, together with iron oxide absorbed from the atmosphere, form fluxes in the brick at the working temperature which tend to migrate upwards, presumably under capillary action, leaving a more refractory working face.

The properties of the various zones from an acid open hearth furnace roof that had been in use for 7½ weeks are given in Table III. The changes which have occurred are by no means as marked as those generally noticed in basic open hearth roofs, possibly because the shorter life has not permitted such

perfect maturing. However, the results at least serve to illustrate certain trends, namely, an increase in bulk density and decrease in porosity in zone B due to the infiltration of fluxes from the surface. This denser texture is also reflected in the permeability. Pyrometric cone equivalent tests made on sections cut from the various zones do not show the increased refractoriness of the working face which are considered characteristic of matured basic roofs, and which has been observed by other workers on cones cut from the working face of acid roofs.

Microscopic examination does show, however, that the working face or gray zone consists of a cristobalite network. Scattered throughout this network are comparatively large inclusions of magnetite and so much more marked is their presence than in a basic roof that one can tell whether a roof comes from an acid or a basic furnace by examining under the microscope a section through the gray zone. The second zone, as with the basic open hearth, consists mainly of tridymite crystals, often in the form of large arrow head twins together with magnetite and brown glass.

Lines of Improvement

Undoubtedly the main chance of improving the life of a silica roof in an acid open hearth furnace lies in the application of recording pyrometers. The results of a study of an open hearth furnace roof from the quarry to the tip have been given in a recent preprint from the Iron and Steel Institute (London). In one section of this investigation which was carried out jointly by the Oughtibridge Silica Firebrick Co., Ltd., the British Re-

TABLE II
Analyses of Zones from Roof Brick of Acid Open Hearth Furnace*

Zones	Roof Brick Material Analyses, Per Cent						
	SiO ₂	Fe ₂ O ₃	FeO	Al ₂ O ₃	CaO	MgO	MnO
1a.....	85.3	9.0	5.4	0.7	0.1	0.3	0.3
2b.....	72.7	17.8	6.7	1.2	0.9	0.3	0.4
3b ₂	86.4	3.0	2.3	2.2	6.1	0.4	0.1
4c and d.....	94.5	0.3	2.0	1.0	2.4	0.3	0.1
Drips from brick end.....	79.8	9.7	6.4	1.4	1.4	0.3	0.7

* Larsen and Schroeder.

fractories Research Association and the United Steel Companies, Ltd., the results of pyrometer readings taken over a full campaign are compared with those shown by thermocouples inserted at different levels in the roof.

Sosman, in an extremely useful and interesting paper on open hearth roof pyrometry, has put forward the suggestion that "readings taken in an open hearth furnace, while there is flame in the furnaces, give a false temperature because of the reflection from the glazed roof and walls and from the liquid slag. The true temperature can be obtained only at the moment of reversal of the furnace. The short vertical lines extending downward from the main portion of the record would end in the true temperature of the roof if they could be made instantaneously or if the temperature of the roof, slag and walls were uniform."

At the beginning of this cooperative work it was assumed that readings of 3092 deg. F. or over were the result of flame reflection, the true maximum temperature lying between 3002 deg. and 3056 deg. F. It was, however, observed that the fluctuation of the radiation pyrometer at each reversal was accompanied by a corresponding fluctuation of the thermocouple nearest the hot face. When the radiation pyrometer fluctuated 122 deg. at a reversal, a thermocouple $\frac{1}{2}$ in. within the roof showed a change of 68 deg. F. From these and other observations it was concluded that the error in the pyrometer reading due to flame reflection was only of the order of 50 to 70 deg. F., and hence that the roof actually did frequently attain a temperature of 3092 deg. F. or over.

Refractoriness tests carried out on the hottest zone of the roof brick after use helped to elucidate this problem for while a test piece cut from the nose of the brick did not soften until 3146 deg. F., a cone made from the powdered material fused at 3074 deg. F. These results suggest that the effective refractoriness of the working face is considerably greater than would be expected from equilibrium considerations because the cristobalite network remains comparatively strong up to temperatures approaching that of the melting point of the pure material.

The application of recording roof pyrometers to acid open hearth furnaces is peculiarly difficult because of the short life of the back well. With the basic open hearth furnace, the water cooled pyrometer is set up outside the back wall and a special chrome-magnesite block is built into the wall which contains a suitable sight hole. Alternatively, such a sight hole is built by cutting standard chrome-magnesite squares. With the basic open hearth, the back wall life is of the order of 13 weeks and during this period the pyrometer only requires the usual periodic calibration, but with an acid furnace where the back wall life is frequently only three weeks, the pyrometer must be continually moved. An attempt is being made to devise special gear to make this removal easier, but at the moment it presents a serious difficulty.

It is possible that some special refractory such as zircon or even an ordinary basic refractory such as chrome-magnesite, may eventually be used for acid roofs, but it must be borne in mind that, whereas basic fragments falling onto a

basic hearth are much less objectionable than silica, such fragments falling onto an acid hearth might result in bad holes in the bottom.

The Back Walls

As with the basic, the acid furnace back wall may be either vertical or of the Naismith fully sloping type. As will be shown later, the angle of rest of sand is quite low (33 deg.) compared with that of fettling dolomite, but the design of back wall does not appear to differ in the two furnaces. Thus, in one set of drawings the brickwork, both for the acid and basic back walls, slopes at an angle of 56 deg. to the horizontal while the material half way up the wall is shown resting at an angle of about 48 deg. The point is clearly one of importance since if, in fact, the sand tends to run down the wall, then a comparatively great thickness will be required at the bottom to insure that the whole of the wall remains covered. If this thickness is greater than that allowed for, then clearly the designed bath capacity will not be achieved. In practice, however, the fettling layer is thin and the banks sticky, and hence angles considerably in excess of 33 deg. may be obtained. Most acid open hearth furnaces, however, do not incorporate sloping back walls but merely have a vertical silica wall generally 18 in. thick. Where this type of construction is employed care must be taken to allow for adequate expansion both horizontally and vertically. If the vertical expansion is not adequate, the pressure on the roof may shear the bolts on the skewback channel and cause slipping of the roof during a subsequent repair.

Materials

First class silica brick should be used for the back wall, and hard fired brick are desirable provided the furnace can be heated up at a controlled rate. Soft fired brick, with specific gravity from 2.48 to 2.52, have been used but often with disastrous results, the after expansion being so great as to shatter more than half the wall in the first few days of operation.

Chrome-magnesite brick have been tried in acid back walls but so far the results obtained are not particularly encouraging. These brick will withstand both the furnace atmosphere and any siliceous drip that may fall from the roof,

TABLE III
Properties of Zones in an 80-Ton Acid Open Hearth Furnace Roof Brick
After 7½ Weeks

	Zone A	Zone B	Zone C	Zone D
Length of zone, in.	2.559	2.362	1.772	4.331
Apparent porosity, per cent.	20.7	11.3	21.3	22.5
Bulk density, gm. per cu. cm.	1.90	2.07	1.83	1.82
Apparent specific gravity	2.38	2.33	2.33	2.33
Permeability to air.	0.30	0.043	0.11	0.14
Pyrometric cone equivalent, deg. F.	3056	3056	3110	3092
Microscopic examination.	Cristobalite network and magnetite	Tridymite arrow heads, magnetite and brown glass		

TABLE V
Properties of Chrome Brick for Use in Acid Open Hearth Furnace Ports

PROPERTIES	Special Chrome Brick	
	M. C. 12	C. 1
Apparent porosity, per cent.....	17.3	13.7
Bulk density:		
C. g. s. units.....	3.23	3.27
Lb. per cu. ft.....	202	204
Apparent specific gravity.....	3.90	3.79
Permeability direction:		
C. g. s. units.....	Perpendicular 9x2½ in. face, 1 skin 0.054	Perpendicular 9x3 in. face, 1 skin 0.015
After contraction:		
Treatment.....	2 hr. 2732 deg. F.	2 hr. 2732 deg. F.
Length change, per cent.....	0.2 (shorter)	0.3 (shorter)
Refractoriness under load:		
Rising temperature test, 25 lb. per sq. in.,.....		
Failing temperature, deg. F.....	2840	2786
Thermal shock resistance.....	3	27†
Bursting expansion:		
1 hr. at 2912 deg. F.....		
2.2046 lb. mill scale, per cent.....	49.6	38

but that the slag running off these brick is basic in character and tends to cut into the acid banks.

Life and Causes of Failure

The life of the back wall is rarely more than three or four weeks in spite of the fact that little or no lime and no dolomite is charged into the furnace. The short life shows once again how close to the melting point of silica such furnaces are operated, and how essential it is to reduce to a minimum flame impingement on back walls which may easily occur due to the entry of air through the doors.

Lines of Improvement

A good deal of work has been carried out by United Steel Companies on the possibility of increasing the life of back walls and banks by improved fettling. It is too early

to give any definite results from this work, but some of the preliminary indications will be discussed in a later section dealing with the acid hearth.

The Front Wall

Considerations similar to those discussed for vertical back walls apply to the front wall. In addition, recent experience has brought home the need for the use of first class cements for this work. When the first acid Maerz furnace was built in one of the United Steel Companies' works in 1939, it permitted observation of the front wall through a spy-hole in the back wall, and it was noticed that the falling-in of the front wall was largely the result of premature softening of the silica cement used to joint the brick. This was found to consist essentially of a mixture of sand and

clay, the proportion of clay being such as to bring the composition close to the eutectic in the alumina-silica system which has a melting point of only 2813 deg. F. Later cements made either with ganister with a very small clay addition, or by fine grinding used roof brick with a small quantity of gum, namely, sulphite lye, showed a much higher refractoriness (over 3074 deg F.).

Table IV shows the properties of a number of open hearth furnace silica cements as given by Dodd and Green. It will be seen that the silica content is always over 90 per cent and that the refractoriness is never lower than 3002 deg. F. except in the case of cement 1, whose analysis is not given. It appears that samples C and F are lime bonded, while the remaining samples are bonded with small amounts of clay. The closeness of the specific gravity to that of raw quartz suggests that comparatively little crushed silica brick has been incorporated in these cements.

The preference shown for cements of low refractoriness is understandable, since sand-clay mixtures are easily worked while ganister batches, containing comparatively little clay, tend to be gritty and only retain their water for a short time when placed on a silica brick. In this connection, care should be taken to differentiate between lack of plasticity and lack of "stickability." Thus, one cement that was of suitable refractoriness but would not adhere to the brick when the latter were turned upside down, was put right by the addition of about 0.25 per cent of sulphite lye which did not appreciably affect the plasticity but made a great difference to the "stickability."

TABLE IV
Open Hearth Furnace Silica Cements*

Silica Cements	Material Analysis, Per Cent							Loss on Ignition	Screen Analysis, Per Cent					Refractoriness, Deg. F	Specific Gravity
	SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	CaO	MgO	Alkalies		On 20	Through 20 on 30	Through 30 on 60	Through 60 on 90	Through 90		
A	90.2	3.5	1.4	0.2	0.8	0.4	0.9	2.1	6.1	5.2	21.9	25.4	41.4	3056	2.85
B	90.6	2.9	1.8	0.3	0.8	0.3	0.8	2.0	16.4	6.5	14.7	12.3	50.1	3020	2.85
C	91.0	1.9	0.6	0.1	2.6	0.3	0.5	2.9	4.0	6.2	23.3	13.1	53.4	3074	2.85
D	94.7	1.8	0.6	0.2	0.5	0.3	1.0	0.6	4.2	13.5	20.7	13.5	48.1	3164	2.86
F	92.0	3.0	1.6	0.2	0.9	0.3	0.7	1.0	10.8	8.0	26.4	22.7	32.1	3119	2.59
F	93.6	2.0	0.3	0.1	3.5	0.1	nil	nil	0.7	1.0	39.5	15.1	44.0	3074	2.63
G	94.2	1.0	1.7	0.1	2.0	0.6	nil	nil	6.5	6.6	31.3	24.9	30.7	3074	2.59
H	.....	.....	.....	.....	.....	.....	.....	.....	3.6	13.8	43.3	12.5	26.8	3146	.....
I	.....	.....	.....	.....	.....	.....	.....	.....	4.1	3.7	14.2	11.3	66.7	2930	.....

* Dodd and Green

In view of the damage that may be done to the brickwork of the furnace by the use of an inferior silica cement, it is suggested that either one very superior quality only should be used in the steel plant, or that some clear method be employed to differentiate between cements suitable for use above the stage level and those whose refractoriness only justifies their use in lower temperature regions, namely, in the checker chambers. The fact that cements do vary greatly in their refractoriness is shown by the condition of the test pieces photographed in Fig. 2 which had all been heated to 2912 deg. F. One cement that had given excellent service in ports is still quite dry, while the other has slumped completely.

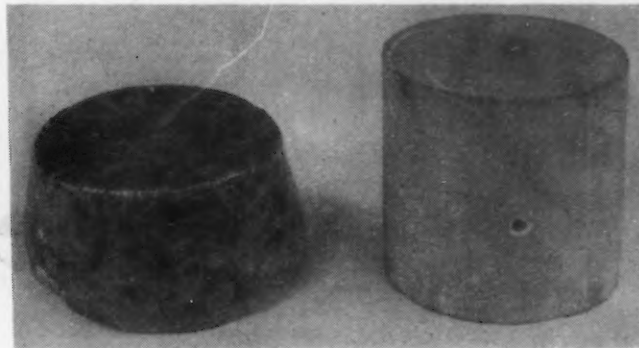
Ports

The gas and air ends will not be re-discussed as they are similar to those in the basic furnace. The ports are, however, often very different, being usually of silica brick and frequently not water cooled, as shown in Fig. 3. With venturi ports, special chrome or chrome-magnesite brick are employed together with a series of water cooling pipes. The physical properties of two such bricks are given in Table V. Ordinary chrome brick tends to contain a considerable amount of bond of low refractoriness and consequently squat at comparatively low temperatures under load. Special bricks, however, which have been "stabilized" by physical or chemical treatments show much better properties, and two samples given herewith having a fail point of 2822 deg. F. and 2786 deg. F. under 25 lb. per sq. in. When used together with water cooling they do not show any sign of slumping as would be expected for ordinary chrome brick, and provide a much more durable nose to the port.

It will be seen that these particular bricks, both of which have given good service in acid venturi ports have a low porosity, a fairly low permeability and a quite low after-contraction. They do, however, show a very high bursting expansion in contact with iron oxide and it is surprising that more trouble is not experienced in practice due to this cause. Chrome brick has presumably been selected for this purpose because they were considered to be neutral, but chrome-

FIG. 2 — Silica cement test pieces after firing 1 hr. at 2912 deg. F. The sample on the left is a low melting point sand-clay mixture and that on the right is a refractory cement.

o o o



magnesite brick has been used by some firms for acid furnace ports without any serious effect on the silica banks.

Other special ports, namely, "dry" Maerz ports, have also been used and have given good results. Both these and the ordinary ports are periodically repaired by forming a Scotch block as employed with the basic furnace. There are various ways in which this can be carried out, but, in general, used roof brick, or rather the cool ends of such brick, are crushed in an ordinary solid bottom pan-mill together with an addition of fettling sand of up to 25 per cent. The batch is milled for a few minutes together with a small amount of dextrin or sulphite lye and is then rammed in position using a steel template to obtain the lines of the port. Such

monolithic ports wear quite well and enable a furnace to be kept on without damage to the roof which would otherwise occur due to poor flame direction.

As with front and back walls, the quality of the jointing cement for ports is of the utmost importance. In the ordinary way, the cement cuts away before the port blocks allowing gas leakage on the incoming end which affects the life of the port and acts unfavorably on the furnace as a whole. The use of special cements in this position, illustrated in Fig. 2, has increased port life by over 50 per cent.

EDITOR'S NOTE: Next week the author will complete this discussion on acid open hearth refractories, describing the type of refractory and materials used in the construction of the hearth, gas and air uptakes, checkers and doors.

FIG. 3—An acid open hearth furnace port. The gas coke oven pipes used for drying and heating up the furnace prior to gassing are shown in the foreground.



.. Steels For Plastic M

THE success of plastic molding operations is very much dependent upon the design and quality of the steel molds which shape the plastic materials. Operating under high temperatures, generally 300 to 360 deg. F., and high pressures, 1000 to 5000 lb. per sq.

in., the molds must perform satisfactorily for large productions, usually well in the hundreds of thousands.

While these steel molds represent rather costly investments, they are worth every dollar spent on them in terms of acceptable articles in

uninterrupted production. In the light of present war time production demands, it is essential that those groups participating in the design and constructions of molds for plastics, make every effort to avoid costly delays and insure an acceptable production.

New types of plastic materials have been developed within the past year, some of which may not be molded in the presence of earlier steels developed for molding phenol-formaldehyde plastics. Instability at molding temperatures in the presence of some steels is the drawback of newer polyvinyl resins such as polyvinylidene chloride (Saran). Analyzing the chemical resistance of molds to plastic materials at molding temperatures, it will be found that considering plastic materials developed to date, the mold steel may be attacked under the following circumstances:

(1) Sulphur present in the plastic material, thio-urea molding compounds for example. (2) Products of decomposition, such as hydrochloric acid, may etch the mold surface. Polyvinyl chloride, polyvinylidene chloride, and chlorinated vegetable by-products may do this. Long contact of cellulose derivatives, such as cellulose acetate or cellulose acetate-butyrate, with mold steels at high temperatures will liberate acetic acid and butyric acid which may stain mold surfaces.

Chromium plating has helped in some cases, although this has not been the full answer. Where extreme chemical resistance is important, special alloys are employed.

Plastic Mold Parts

Before analyzing the physical factors governing the selection of steels for plastic molds, it is well to examine a few representative mold types. Fig. 1 for example shows

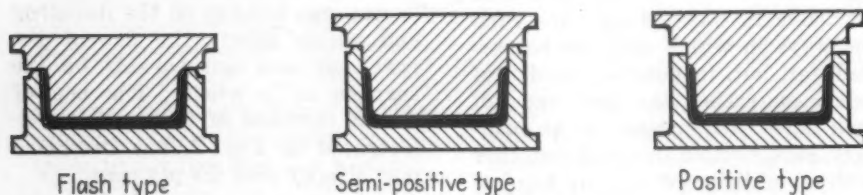


FIG. 1—Schematic diagrams of flash, semi-positive and positive type compression molds.

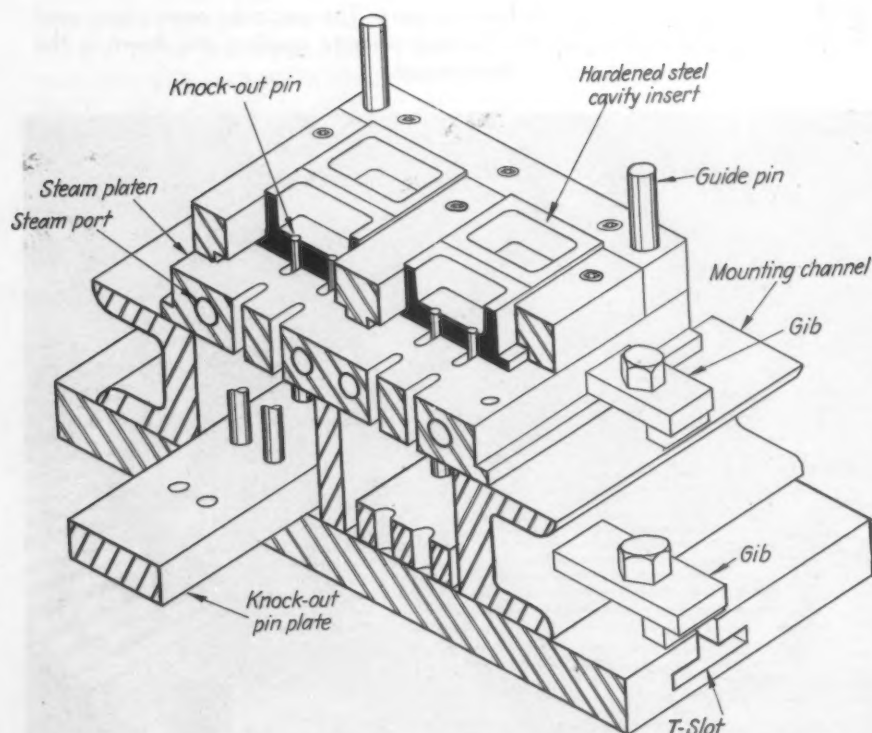


FIG. 2—Sectional view of a multiple cavity mold for compression molding.

c Molding

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and

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schematically the differences between a flash, a semi-positive and a positive mold. In the semi-positive or positive mold, the upper force or punch will rub against the side walls of the chase which defines the mold cavity. As would be expected the wear on this part may be excessive in the course of time. This tendency may be alleviated somewhat by: (1) Reducing overall punch dimensions by undercutting the part $\frac{1}{4}$ to $\frac{1}{2}$ in. back from the molding surface, and, (2) having a steeper taper on the punch than the chase. In either case, however, some molding material will escape between punch and chase, no matter how small this space may be.

Flash molds, however, experience their greatest wear on the landing pads or land areas which arrest the downward motion of the punch as molding pressure is developed upon the material. In consequence, the flash line, over which excess material flows during molding, may increase from a desired thinness of 0.002 to 0.003 in. to as thick as $\frac{1}{32}$ in. after the mold or land area wears down.

Plastics molds are not as simple as the units just illustrated, and are in fact built up of numerous components, all of which contribute to their efficient operation. Before steels can be specified for molds, the component parts and their functions must be fully understood. In Fig. 2 the important parts of a section of a multiple-cavity mold are illustrated. The features that will probably be novel to engineers acquainted with metal working tools are the ejection pins, ejection pin plate, and steam ports. In the design of plastics molds methods of ejecting the piece

... A discussion of the types of steels suitable for use in the various component parts of plastic molds and extrusion dies, and some general rules on the selection of such steels.

from the mold cavities must be carefully planned to insure full ejection of the piece, as well as avoid breakage of the molded parts. Devices such as auxiliary cylinders actuate the ejection mechanisms on the semi-automatic molding presses. The functions of each of the tabulated parts are shown in Table I.

In some instances there might be loose mold pieces, such as thread forming rings. These parts, which will be removed with the molded articles at the time of ejection,

are unscrewed from the molded piece and reassembled to the mold proper. From the foregoing description of a representative plastic mold, it should be apparent that the steel required for the mold cavity inserts will have appreciably different physical properties than steel required for the chase of mounting channels. An oil hardened tool steel is usually necessary for the mold insert of compression molds, while a milder tough steel will suffice for certain other parts. In fact the com-

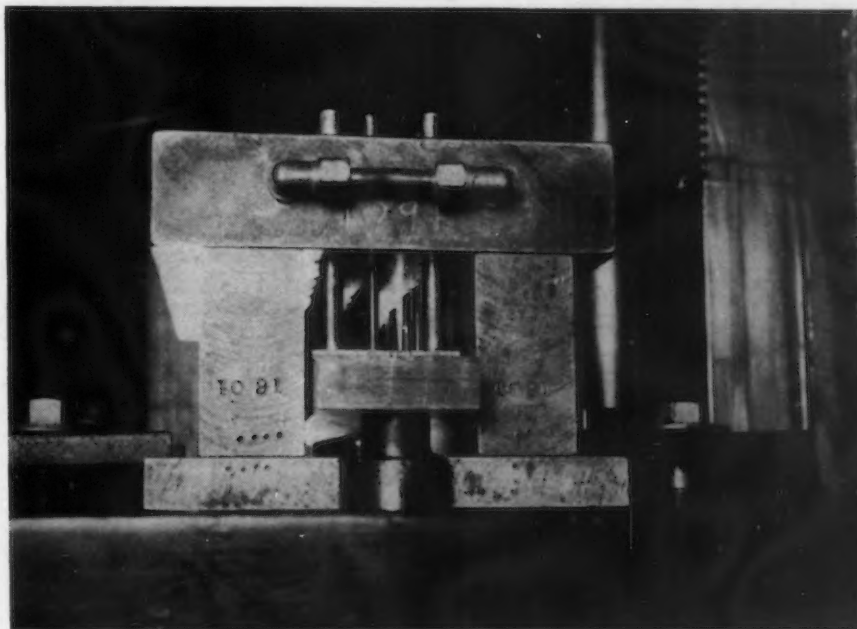


FIG. 3—This section of an injection molding die carries the ejector pins.

plexity of the mold design will often determine the nature of the mold insert steel. For more intricate parts, a SAE 3135 steel would be preferred, while for general construction, SAE 3312 steel is a representative example, the latter being carburized and heat treated to necessary surface hardness.

Pins in Molds

Probably in no other production tools are hardened steel pins or drill rods more numerous than in plastics molds. Every so often one will break, and it is imperative in good mold design to permit their replacement with a minimum of loss in production time. Various pins employed in plastics molds are as follows:

(1.) **Ejection Pins:** These are employed in pushing molded pieces from the cavities, and may be quite numerous. For example, an end view of a plastic injection mold, showing numerous pins, is shown in Fig. 3.

(2.) **Molders Identification Symbol:** This marking is generally made in an inconspicuous location.

(3.) **Cavity Number Pin:** It is the practice to identify various cavities of multiple cavity molds by a letter or numeral.

(4.) **Insert Holding Pins:** Screw machine inserts or stampings are frequently molded integrally with

the plastic material. These are positioned by suitably displaced pin.

(5.) **Coring Pins:** Reproducing portions or cavities in the molded articles are hardened horizontally or vertically mounted coring pins.

(6.) **Guide Pins:** Employing two or more hardened and ground guide pins, plastics molds are accurately positioned in correct relationship to one another.

Two further production tools well known in the plastics industry are injection molds and extrusion dies. In Fig. 4 will be recognized the component parts of an injection mold and Fig. 5 a typical extrusion die. A hardened, accurately finished sprue bushing connects the nozzle of the injection molding machine to the mold cavities and the inside is carefully lapped out after finishing with a tapered reamer.

The injection molds designs are considerably different from those for compression molds in that no loading space is required for the molding material. In fact, the usual practice is for the molding material to flow down the sprue, through runners and gate into a cold, closed cavity. The ports illustrated in the injection molds are for circulating cooling water, whereas for compression molds, live steam at about 150 lb. pressure is required for heating.

Aside from these features, the

practice of employing hardened steel inserts for mold cavities is usually observed, with milder steels for other mold parts, depending upon their function. Ejection pin plates are operated by ejector bars forming integral parts of the injection molding machine. Extrusion dies are subject to a very high extrusion pressures and temperatures, as well as the continuous passage of a mildly abrasive material. Well polished, hardened, abrasion resistant steels are pre-requisites for their success.

Mold Cavities Steels

The characteristics that steels must have to make them acceptable for plastic mold construction are varied. Plastic molds must in most cases have a high degree of polish to reproduce the glossy articles usually expected, and this will of course influence the selection of the proper mold steel. The prime factors governing choice of mold steel are:

(1) Total production required, as this will often determine the

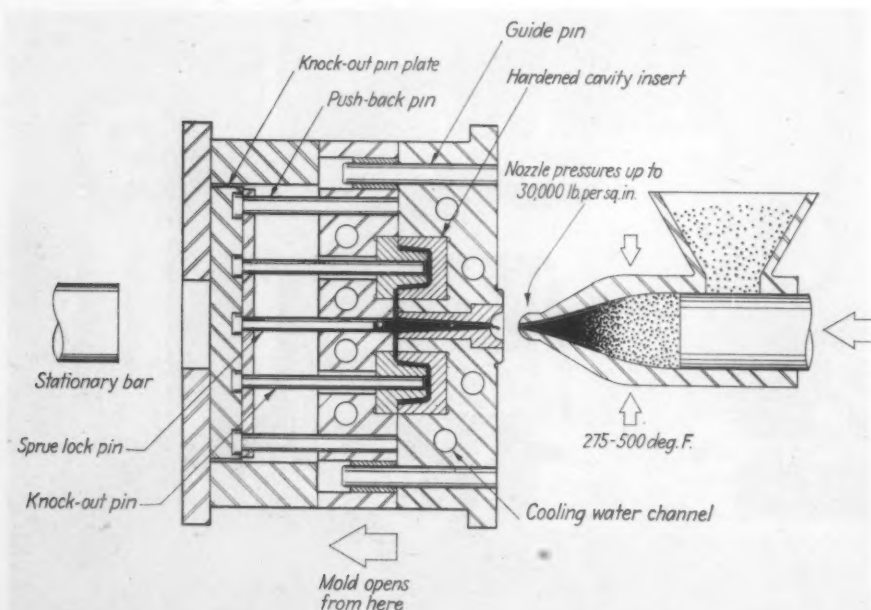


FIG. 4—Injection molding die shown in cross-section. The heating cylinder and injection plunger are shown schematically at the right.

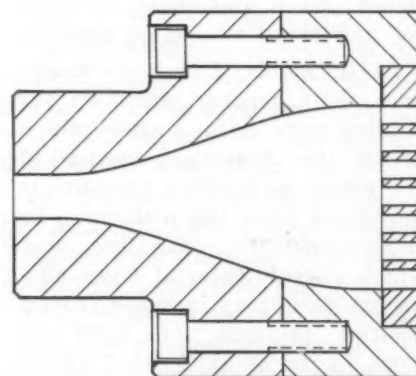


FIG. 5—Special steels are required for extrusion dies to prevent their being attacked by some of the newer thermoplastic materials.

amount to be invested in the mold; (2) ease of machining or hobbing; (3) wear resistance; (4) finish required on molded parts, and (5) chemical properties of plastic in presence of steel.

Large productions should not skimp on mold costs and should invest in the best steels. The steels shown as follows apply to those portions of the mold making contact with the molding material,

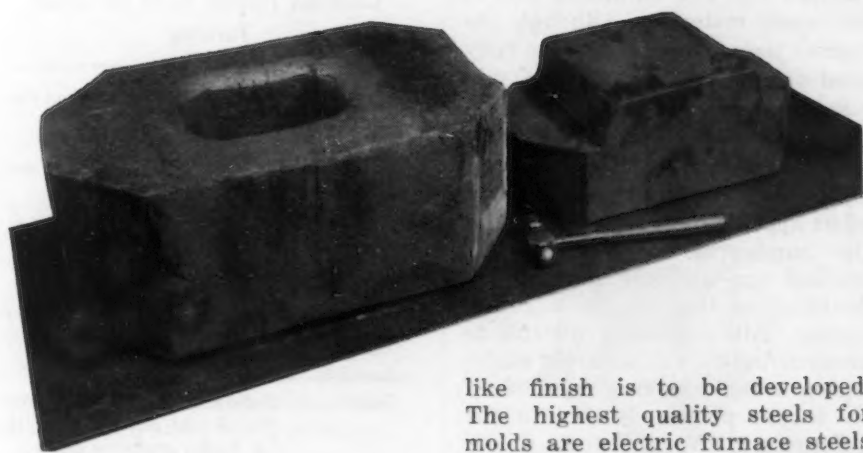
RIGHT

FIG. 7 — Machining the die blocks shown in Fig. 6. Smaller dies may be hobbled by using pressures up to 100 tons per sq. in.



BELOW

FIG. 6 — These two rough forgings for a compression molding die weigh 2252 lb. They have been annealed preparatory to machining.



and surfaces of mold inserts are hardened in all cases to 62 to 64 Rockwell C.

Steel Type	Use
SAE 1010 or 3110	Medium production, hobbled cavities, general molding.
SAE 3312	Large molds, high molding pressures, large productions.
High carbon, high manganese	Intricate, close tolerance molds, with minimum distortion.

The first two steels shown are, of course, carburized before hardening. It is important that the steel be uniform and clean, containing no non-metallic inclusions. This is essential if a clean, mirror

like finish is to be developed. The highest quality steels for molds are electric furnace steels and these steels are machined from forgings, as shown in Figs. 6 and 7, or prepared by hobbing. The steel is thoroughly annealed to make the machining easier.

The hobbled out cavities are in turn heat treated and hardened, then tempered. The master hobs must be tough and hard through the core. Perfect cleanliness is also essential. There are air hardening and oil quenching types, both containing carbon 1.5 to 2 per cent and 12.0 to 12.5 per cent chromium. They may be modified with other alloys. The oil hardening grades possess the greatest wear resistance. The in-

telligent selection of steel, however, must be predicated by full comprehension of the operations to be performed by the plastics molder.

Silver in Aircraft Alloys

BECAUSE of their high physical properties it appears likely that applications will be found in the aircraft field for new light weight silver-rich magnesium alloys.

Data furnished by the American Silver Producers' Research Project on a magnesium alloy containing 5.5 per cent silver, 2.6 per cent each of aluminum and zinc and 0.2 per cent manganese indicate this possibility. The new alloy in extruded bars, rolled sections and large forgings, properly heat treated, has a tensile strength of 40,000 to 65,000 lb. per sq. in. Yield strength is 32,000 to 50,000 lb. per sq. in. elongation 2 to 10 per cent, Brinell hardness 80 to 95. Specific gravity is only 1.89. Corrosion resistance is comparable to all except the most corrosion resistant of commercial magnesium alloys.

Mechanical Clamp fo

ASHELL contractor in the St. Louis Ordnance District (through whose office these data have been made available) has successfully applied a new type of mechanical clamp illustrated, to cemented carbide turning tools for 155-mm. shells. This structural fabricator, who is located in Nebraska and operates a big machine shop, receives rough turned shell forgings from a Western steel mill and finishes the shell on Curtis lathes especially devised for this work by a committee of the National Machine Tool Builders' Association. (For a description of these lathes, see the March 6, 1941, issue of THE IRON AGE, page 54.)

The clamping device not only serves to hold the tip in place, but also acts as a chip breaker. When

A mechanical chip breaker of similar design for brazed carbide tips was illustrated in the article on "Tool Angles for Steel Cutting Cartridges," by Harry S. Wilcox, which appeared in the March 20, 1941, issue of THE IRON AGE, page 39.

the clamped carbide tip needs to be reground, it is advanced out of its socket by putting shim stock behind the two side walls. In this way, the tip can be reground a number of times until it is too small to clamp effectively. Then it can be brazed to a shank in the conventional manner until the tip is used up.

With this method of fastening the tip to the shank, it is not necessary to use a soft green wheel (silicon carbide) to grind back the shank steel along with the two tip faces; it is only necessary to use a diamond-impregnated wheel to redress the carbide blank itself. Best procedure is to withdraw the tools from their holders at definite production intervals and before serious spalling of the carbide has set in. In this way, the amount of material removed at each regrind is held to a few thousandths, and overall tool life is lengthened.

Comparable test data are presented on these mechanically clamped tips and on brazed tips of the same material. Although the former tools have not yet been fully used up, it is apparent that a substantial increase in tool life is being obtained. From experience with these mechanically clamped tools obtained to date, the chief beneficial effect appears to be the reduction in the number of failures due to cracked tips and the approximate doubling of tool life as a consequence. Although it is difficult to prove definitely, the apparent explanation is that cracking in a brazed tip occurs principally due to the difference in the coefficients of expansion of the cemented carbide tip

and the steel shank material, which in this instance is SAE 1045 steel. The difference in the rate of shrinkage of the two materials sets up internal stresses in the blank when it is cooled from the brazing temperature. In fact, good practice in brazing calls for burying the tool in powdered charcoal, graphite, asbestos, mica or lime so as to produce a slow cool from the brazing furnace temperature. Shrinkage strains are also relieved by the use of the so-called sandwich braze in which a sheet of constantan metal (a cupro-nickel alloy with a con-

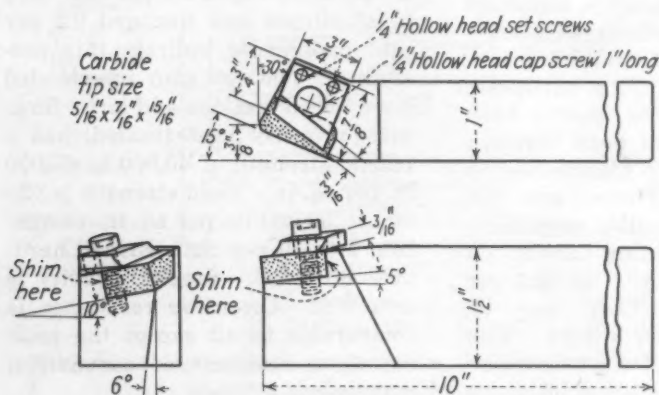
Test Data on Brazed and Clamped Carbide Tipped Tools for Shell Turning

Test No. 1—Kennametal KM Grade tool tips brazed to tool shank:

- (a) Average number of shells cut per tool = 1198.
- (b) Tips ground 18 times.
- (c) Tips showed crack after cutting 830 shells.
- (d) Shells cut per grind = 74.

Test No. 2—Kennametal KM Grade tool tips using mechanical clamp, no brazing:

Tool No. 1—Shells machined	1400
No. of tool grindings	12
Tip broke, probably due to bad mounting of tip.	
Shells per grind	117
Tool No. 2—Shells machined	1538
No. of tool grindings	12
No cracks developed; tip only about one-half used up.	
Shells cut per grind	128
Tool No. 3—Shells machined	1538
Tool grindings	12
No cracks developed; tip only about one-half used up.	
Shells cut per grind	128
Tool No. 4—Shells machined	1538
Tool grindings	12
No cracks developed; tip only about one-half used up.	
Shells cut per grind	128



THIS cemented carbide tip is not brazed to the shank—it is held by the mechanical clamp shown. The two set screws under the clamp raise one end of the clamp plate so as to concentrate pressure on the lip which bears on the carbide blank. Vibration will not jar this tip loose.

for Carbide Tip . . .

stant temperature coefficient) is placed between two layers of hard solder, like Easy-Flo.

It should be noted incidentally that all cutting of steel shell forgings is done dry at this particular plant. This condition eliminates the factor of tip cracking due to coolant striking a hot tip which has been under a chip "umbrella" during cutting, and is suddenly exposed to the cutting compound when withdrawn from the work.

It should be added that the test results tabulated cover only one brand of cemented carbide, namely Kennametal KM grade. Two other brands of steel cutting carbides

. . . Substitution of a mechanical clamp for brazing of cemented carbide cutting tips has enabled one artillery shell contractor to double the tool life per grind.

□ □ □

with brazed shanks were also tested, and these showed comparably poorer results, one run of 14 tools showing cracks after an average of 105 shells and the other, involving 10 tools, after cutting an average of 203 shells. The shells cut per grind were 32 and 38 respectively. With the Kennametal tips, changing from brazing to mechanical clamping

doubled the tool life per grind, from 74 to 128 shells produced.

Although the publication of this article has been approved by the St. Louis Ordnance District of the War Department, it should be understood that the Ordnance Department does not indorse this or any other method of turning shells, inasmuch as this is left entirely to the shell machining contractors.

Low Frequency Induction Heating Furnace

A NEW low frequency induction melting furnace for non-ferrous melting was recently marketed under the name Ajax-Wyatt furnace by the Ajax Electric Furnace Corp., Philadelphia. Installations of this furnace to date have proved especially its adaptability to melting aluminum and aluminum alloys, particularly duralumin.

The electric operating principle involves transferring energy at ordinary commercial frequencies by means of induction, the practical application of which is illustrated in Fig. 1. With the input of current through the primary coil, A, the transformers, B, are energized, inducing heavy current flow in the V-shaped channel, C, where the phenomena known as motor-effect and pinch-effect occur. The channel, C, is always filled with molten metal and serves, with the full crucible, as a closed ring secondary of the transformers. Because of the low resistance of the metal

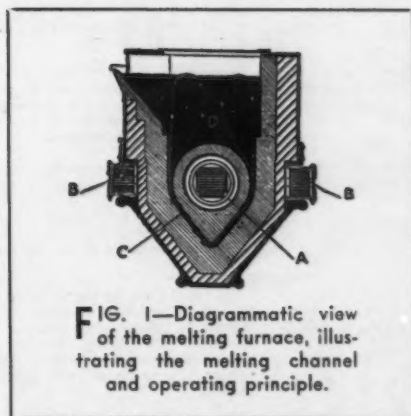


FIG. 1—Diagrammatic view of the melting furnace, illustrating the melting channel and operating principle.

in the channel, a relatively high current flows freely, producing a high concentration of controllable heat.

Simultaneously, powerful magnetic fields within and about the channel establish an interplay of electromagnetic forces causing the molten metal to flow upward, permitting cooler metal from the main crucible, D, to enter the channel

as indicated by the arrows. The entire motion is smooth and continuous. This vigorous internal stirring action is visible, and tends to blend the metal, making a homogeneous mass.

These low frequency induction melting furnaces are constructed for spout tilting or center tilting. Spout tilting is especially suitable where metal is poured directly from the furnace into molds, while the center tilting type of furnace is used in foundries where molten metal is conveyed in a ladle from the furnace to individual sand molds. When fully charged, the center of gravity of the furnace is slightly above the revolving center, permitting easy pouring.

Since the heat is generated within the charge itself and energy does not have to be radiated or convected to the metal, the unit is claimed to give efficiency estimated at 15 per cent higher than any other method yet devised.

ASM-WPAC Aid Small P

WITH the American Society for Metals, and the War Products Advisory Committee offering a free war time service to industry, many small plants and shops that have neither the facilities nor the staff to delve into new problems presented by the production of war materials have found a source of information and help that is definitely aiding them in maintaining a high production rate on necessary war materials.

The committee, organized on a chapter basis, has

been of service in a great many fields, including heat treating, metal fabricating, foundry practice, machining, as well as working out substitutes for scarce materials. Some 50 chapters of the ASM have set up their own committees to handle requests in their areas. Requests from any manufacturer on war work, whether a member of the ASM or not, are invited, the service being offered as a patriotic effort to assist in the war production effort.

Prerequisites of requests are: (1) The plant seeking aid must be engaged in the manufacture of war

TYPE OF MANUFACTURER	ASM-WPAC BRANCH	INFORMATION DESIRED	ANSWER BY ASM-WPAC	REMARKS
Automotive parts maker	Cleveland	Information on the chemical, physical and casting properties on the zinc alloy replacing Zamak No. 3.	Definite specifications have not yet been written but discussion has been based on 2 per cent aluminum in SAE 903 and 1.5 per cent aluminum in SAE 925. ASTM bulletins and the publication of New Jersey Zinc Co., which indicate full data on these alloys are not yet available, were sent to the engineer requesting information.	This firm, directed to authoritative sources of information, is taking up the matter directly with them.
Sheet metal parts	Cleveland	The type of quenching oil for certain shells according to government specification. Is it necessary to use high grade oil or can a cheaper oil be used?	Committee reports that suitable cheap grade oil would be adequate if: Sufficient amounts are used, it is kept properly cooled (90 to 120 deg. F.), and agitation about the parts being quenched is sufficient.	Question was direct result of conversion from peacetime to wartime production. Results entirely satisfactory.
Automotive parts	Cleveland	Substitute alloy for one now being used containing 30 per cent tin. Must melt between 360 and 400 deg. F. Used for small $\frac{1}{8}$ -in. diameter and $\frac{1}{2}$ -in. long fuse plug to control vulcanizing temperature in repair of tire inner tubes.	An alloy of 18 per cent cadmium, 25 per cent tin and 55 per cent lead was suggested, as well as a non-tin alloy of 60 to 70 per cent lead and the remainder bismuth. While the latter tends to be brittle, it can be extruded into a rod. In use, the plug is upset as a rivet, which may present difficulty unless re-designed. It also has a lower softening temperature, which may cause trouble unless temperature rises rapidly.	Company reports aid given is basis for further investigation, and was found helpful, producing desired results.
War materials	Cleveland	How to eliminate cracks around a hub, hot forged in one shot from SAE 75 brass.	Suggestion that forging temperature be closed controlled, within a 50-deg. range, resulted in entire elimination of difficulty.	"Results of the applications suggested were excellent. Many thanks."
Aircraft parts	Cleveland	A suitable coating for an alloy steel aircraft part that would withstand sea water and air corrosion up to 800 deg. F.	One member of the committee offered to plate the sample part by a special nickel plating process. A metal spray process was suggested, especially a marine bronze spray. Aluminum spray was suggested but it is believed this would not be suitable because of a difference in the coefficient of expansion.	Advice aided materially in solving problem.
Aluminum fabricator	Cleveland	How to clean aluminum screw machine parts so as to avoid staining and corrosion.	It was advised that normal technical procedures should eliminate the difficulty, and suggested that degreasing with trichlorethylene and tumbling in sawdust be tried. It was believed that any of the commercial degreasing processes would be suitable.	No report on results.
Aluminum die castings	Cleveland	A treatment for dies used in forging duralumin and brass to avoid checking and to get better die life.	It was believed that too long a dwell was allowed, which permitted the die to pick up too much heat from forging. A reduction from $\frac{1}{2}$ to $\frac{1}{4}$ sec. dwell would probably increase die life. It was also suggested that duralumin be forged at 800 deg. F. or higher, providing there was no sticking or breaking of the die, and brass be forged at 1450 deg. F.	Recommendations were "highly satisfactory."
Porcelain enameled products manufacturer on war work	Cleveland	Method for heating small bombs for swedging sides and for nosing, to eliminate necessity of re-heating as swedging progresses.	The bomb might be heated in the furnace, and as it is picked up in tongs for swedging an internal ring gas burner be introduced to maintain the heat and avoid necessity of reheating. An inspection of the plant's set-up was made, and personal assistance for as long a period as necessary was offered by one of the committee members.	Request recent, no results reported.
Industrial furnace builder	Cleveland	How to make seven cast iron balls for furnace doors.	Committee suggested 0.25 to 0.5 per cent chromium be used, or 0.75 to 1.0 per cent manganese steel, which would probably be easier to obtain. The plant was advised to specify iron with a 40,000 to 50,000 lb. tensile strength, and let the foundry make it according to its own plan.	Results of work by suggested means have been good.
Aircraft parts maker	Cleveland	Heat treating procedure for small coiled springs of flat stock that would avoid excess warpage, or a method of pre-paring stock to obtain same results.	Problem referred to War Production Board for the source of heat treating to handle this situation, since it is obvious special equipment is required. Committee suggested possibility of using pre-tempered material to eliminate necessity of heat treat.	No report from inquirer as to results.
Manufacturer on war orders	Cleveland	How to cut, drill and tap high manganese steel for aircraft parts.	As this material is difficult to machine, it might be cut with an abrasive wheel. It is possible to drill this steel with a high speed steel drill, but only a few pieces per drill can be made. Once drilling is started, it must be continued as the material hardens greatly when drilling is stopped. Another material was recommended if possible.	No results reported. A very recent request.

Plant Operators . . .

products or machines for making them, (2) the problem must be one of overcoming operating or technical difficulties, correcting defects, understanding or meeting specifications, breaking bottlenecks, etc., and (3) the problems must be specific and localized, so as not to require a broad investigation or research for its solution.

To date, most requests have been received by telephone. Such requests are received and transmitted to an expert in the field in which the problem falls,

who tries to work out the answer or consults with others in the field. The answers to problems are submitted as quickly as possible, so as not to delay production longer than necessary. Mail requests are handled in a similar manner, the whole system being based on speed.

Typical of the requests received to date have been some of those received by the Cleveland, Newark and New York chapters, listed in the accompanying work data sheet.

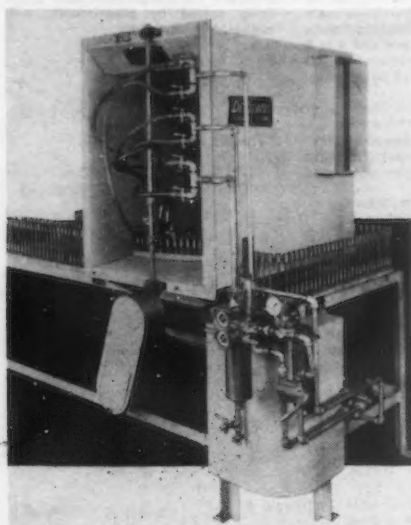
TYPE OF MANUFACTURER	ASM-WPAC BRANCH	INFORMATION DESIRED	ANSWER BY ASM-WPAC	REMARKS
Foundry on war orders	Cleveland	Substitute for tin used to coat steel parts around which is cast gray iron. Tin acts as a bond between steel and iron, according to the inquiry.	In opinion of ASM-WPAC, the tin doesn't act so much as a bond as it keeps the steel clean and free from scale which would react when iron is poured. Sand blast parts to clean, lacquer surface with 1 part lacquer and 4 or 5 parts thinner, to protect, or coat with a 2 per cent tin and 98 per cent lead alloy recently marketed by a major company to coat chaplets.	Company reports problem almost entirely solved by experiments with suggested procedures.
Fire extinguisher maker	Newark	In deep drawing SAE X-4130 steel, trouble was encountered with dies picking up metal.	Suggested that trouble was due to surface decarburization of plate stock after the first annealing following the first draw. An anneal in controlled atmosphere eliminated the difficulties.	"Trouble eliminated."
Machinery builders	Newark	Whether SAE X-1345 could be substituted for Navy specification 49S3 for armature shafts in motor generator sets of special design.	Because SAE X-1345 has higher physicals than the specified material, it would be desired.	
Airplane builder	Newark	Request for specifications of heat treating equipment and quenching tanks for cast and wrought aluminum alloy aircraft parts.	A member of the ASM-WPAC committee visited the plant and worked out a heat treating and quenching procedure, and advised suitable equipment that could be purchased to do the work.	
Industrial equipment	Newark	SAE 4615 steel had been used for rotary scrapers to clean out boiler tubes on marine power plants. WPB denied priority for material, and inquirer wanted to know what substitute could be used.	As any substitute would be a more critical material than the steel heretofore used, the committee arranged with WPB and got an allocation of the desired amount of the SAE 4615 steel.	
Magnesium fabricators	Newark	Information on the foundry practice for casting magnesium and magnesium alloys was desired.	Inquirer was told to write Dow Chemical Co., for information and also for booklet, "Dow Metal Castings." Further information was given them on pattern shrinkage, molding sands and pouring temperatures.	
Scientific instruments	Newark	How to stop sputtering of stellite welding of a part to armor plate.	Committee suggested reducing flame, which worked successfully according to reports from the inquirer.	
	Newark	How to avoid embrittlement of spring clips after cyanide salt bath treatment	Recommended that cyanide content of bath be reduced.	
	Newark	Difficulty was encountered in removing a core from a large steel casting.	An improved core mixture and lower pouring temperature were suggested and the company reported the difficulty was avoided.	
Foundry on ordnance work	New York	How to avoid rusting in a steel bomb body after pickling and washing but before painting.	The committee recommended a phosphoric acid dip to prevent the rusting and also to obtain a better paint surface. This suggestion completely solved the problem.	
War materials	New York	How to solder chromium stainless steel.	Plant was using a solder that required a working temperature higher than critical temperature of the steel and caused air hardening of the steel. Changing solder and flux, and working at lower temperature suggested.	Suggestion completely eliminated the difficulties.
Industrial gas burners	New York	Whether a straight-chromium stainless steel could be substituted for 18-8 chromium-nickel stainless in parts for an industrial gas burner that were exposed to constant temperatures in the neighborhood of 850 deg. F.	Steel of the type plant contemplated using was found to be suitable for continuous operation at 1500 deg. F., but would probably not provide the same service as the austenitic material. However, in view of the fact the 18-8 material could not be obtained, the substitute was recommended.	
	New York	Difficulty was encountered in making machinable welds in cast iron.	Several standard welding rods suitable for the job were suggested.	

New Equipment . . .

Finishing apparatus

Shell finishing, a high production problem, is receiving the energetic attention of builders of cleaning and finishing machinery. Other equipment for plating and finishing is included in this week's news.

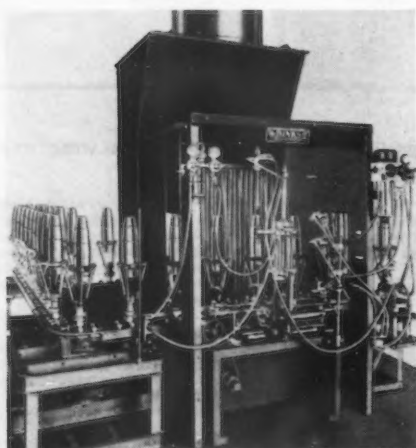
ONE of the more recent developments in shell painting machinery automatically coats the exterior of 20 mm. shells at the rate of 2000 an hour. *DeVilbiss* has built this unit around a chain-on-



edge variable speed conveyor to allow for a 10-min. drying time at a production rate of 1000 shells an hour, and half that time at the maximum rate. Spray guns are of the automatic air piston type with adjustable cam operated spray control. The 10-gal. pressure feed paint tank has a motor driven agitator, and shell supporting spindles are of the removable type with flat surface pulleys for rotation inside the booth. The unit also paints 20 mm. fuses and fuse bodies.

Automatic Shell Coater

SHELLS ranging from 75 to 105 mm. can be automatically spray finished inside and out at the rate of 200 to 500 an hour in a machine just introduced by *Binks Mfg. Co.*, 3140 Carroll Avenue, Chicago. An



oscillating mechanism that engages the shells as they move on their conveyor rotates them in front of automatic spray guns to apply the exterior finish. Still rotating, they pass on to a station where a pneumatic spray gun plunges into the interior cavity to apply the internal coating. A "skip" device prevents the spray mechanisms from operating should there be a shell missing on the conveyor line.

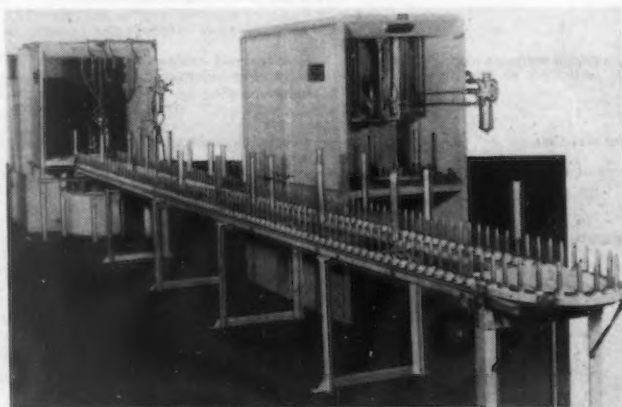
Incendiary Bomb Painter

EXTERIOR and interior surfaces of the components of the M54 four-pound incendiary bomb are automatically sprayed on a new machine built by the *DeVilbiss Co.* The unit has a fully automatic spray station for exterior painting, and one or two semi-automatic spray stations for interior painting. It uses a chain-on-edge spindle type conveyor. Moving from the first

station the cases pass over a section of conveyor which allows a five-minute drying period. When dry they are placed by hand on stands in the semi-automatic spray stations where their interiors are automatically coated. With a 25-ft. conveyor length and two semi-automatic spray stations, the capacity of the unit is 2000 an hour. Eliminating one of these stations and reducing the conveyor length gives a rate of 1000 cases an hour.

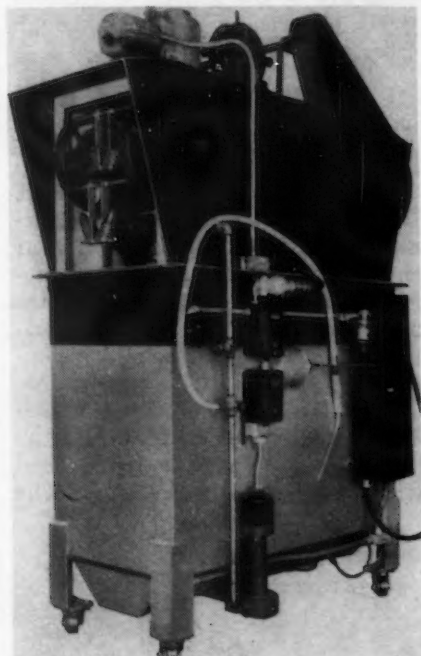
pH Recorder

SIMULTANEOUS records of pH at separate and independent points in a fluid flow system can be utilized to provide a continuous "before and after" picture of pH that enables the operator to continuously see the effectiveness of the process or treatment in use. The *Cambridge Instrument Co.*, Grand Central Terminal, New York, has developed a recorder to give a single chart record of pH at various points; and for the reasons pointed out above, it should make possible production of more uniform products and elimination of waste.



Shell Degreaser

PORTABLE and all-electric in operation, a new shell degreaser manufactured by *Phillips Mfg. Co.*, 340 West Huron Street, Chicago, is designed to cleanse thoroughly the



interior bore of single-end-opening shells. It is also adapted for through-bore primer type shells and cartridge cases. A non-atomizing nozzle enters the shell in the totally enclosed degreaser, moving in far enough to overcome the vacuum effect in the butt end of the shell and remove oil and chips. Before discharge it passes through hot solvent vapors which dry it and remove oil and moisture. A stationary unit operating on the same principles is built for 90 to 155 mm. shell, while the portable unit handles 20 to 75 mm. shells.

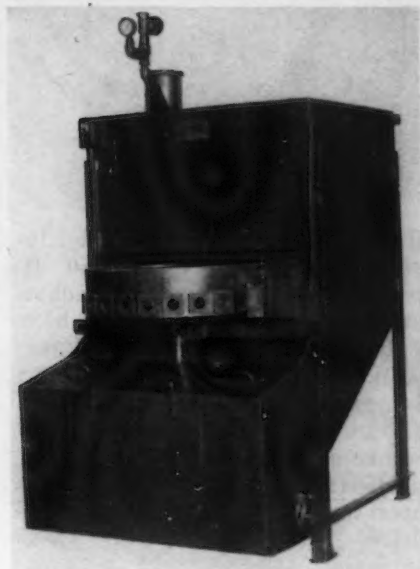
Shell Washer

COSTLY, time consuming "dunking" of shells in tanks of boiling water by means of racks, and the attendant handling involved, can be eliminated by use of a new product washing machine. The *Alvey-Ferguson Co.*, Cincinnati, designed and built the new unit for the removal of grease and chips from 20, 37 and 40 mm. shells. The machine fits into a production line, and, in addition to cleaning the shells, it also dries and

ejects them. The company offers several other new machines for washing, rinsing and drying shells and fuses, bombs, rifle and machine gun barrels and similar ordnance materiel.

Sandblast Unit for Shells

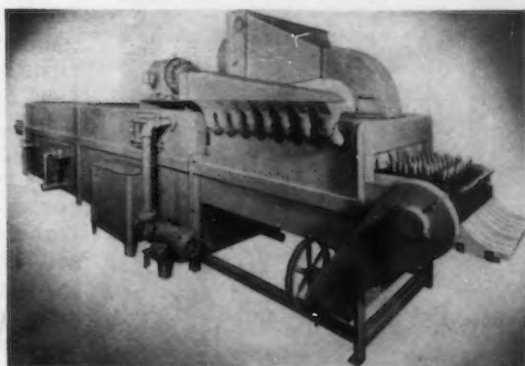
LEIMAN BROTHERS, 136-4 Christie Street, Newark, N. J., announce the development of a rotary table type of sandblast machine for shells and general industrial use. Speed of the table is adjustable, feeding the shells to position before a battery of two or



more nozzles. The abrasive material is drawn from the base of the machine by suction fans and is continually reused. To protect the operator, a power suction blower draws dust from the interior of the unit and a slotted multiple rubber curtain is provided to prevent blow out of the abrasive.

Abrasive Belt Surfacers

A new *Hammond "600" "Dri-N-Wet"* abrasive belt surfacers, in bench and floor types, for wet and dry grinding and polishing, in-



corporates several unusual features. The machine can be moved from vertical to horizontal position while running, and the belt tension and



tracking device can likewise be adjusted by means of two handles while the unit is in operation. Totally enclosed and fitted for individual dust collector or exhaust, it is available with water tank or water main connection. Water and air exhaust connections are interchangeable, and a spray control with two nozzles is provided for uniform spraying.

Acid-Alkali Proof Coating

DEVELOPMENT of a protective coating said to be immune to all acids and alkalis in any concentration and at any working temperature is announced in Detroit. *Protective Coatings, Inc.*, 10391 Northlawn, Detroit, produces this material as a lining for plating tanks and, in fact, all surfaces that must be protected against destructive reagents. It is available in two types, Chempruf "A" and "B," the former a brush-on liquid, the latter applied by the company's own engineers. While it will not resist mineral solvents, its resistance to acids and alkalis surpasses that of either natural or synthetic rubber. Its softening point is 300 deg. F.; the melting point is 510 deg. F.

Finishing Brush

AN interesting application of a new type of treated fiber brush made by the *Osborn Mfg. Co.*, Cleveland, is in the removal of tool marks from aircraft and motor parts such as connecting rods, tappets and cams. Fascut Treated Tampico Section is the name of the new product which is intended for removing burrs, polishing or form-



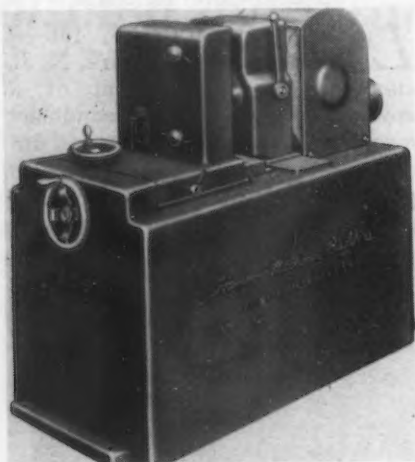
ing metal parts and finishing welded seams. Another application is in the slight rounding of corners of motor parts, gear teeth and kindred products. Used without an abrasive, it will remove burrs without damage from aluminum and Alclad sheet, the company states.

Corrosion-Resistant Coating

CARBOZITE SHOP COAT, a highly corrosion resistant quick drying coating is being extensively used for the protection of bright steel and similar highly finished products in open transit, according to its manufacturer, *The Carbozite Corp.*, First National Bank Building, Pittsburgh. The standard coating deposits a protective skin about 0.002 in. thick, drying in 25-30 min., and will resist the most severe salt water exposure, the company reports. Heavier coatings with slower drying times, but having service life up to many years in length can be furnished too.

Cylindrical Polishing Machine

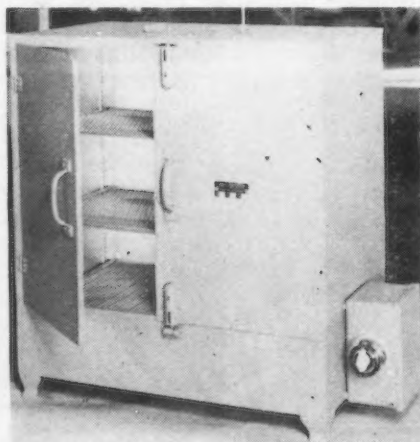
A new machine for polishing or buffing cylindrical shapes, rods and tubes with outside diameters of $\frac{1}{4}$ to 9 in. has been introduced by *Hammond Machinery*



Builders, Kalamazoo, Mich. Its range of feed is 0 to 50 ft. per min., and it is especially adaptable to the use of abrasive belts with back stand attachments, polishing or buffing wheels. The unit is designed, the company says, to permit inexperienced operators to secure quality finishes at high production rates. The "OD" Polisher operates through a variable speed drive.

Small Ovens

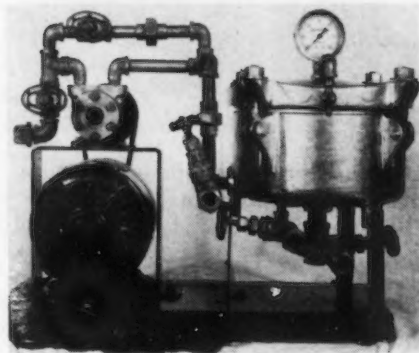
MANY aircraft companies are said to be finding new uses for the laboratory ovens manufactured by the *Despatch Oven Co.* With a temperature range up to 400 deg. F., they are being found useful for drying and baking finishes on small precision instruments, and for drying and hardening radium painted dial faces. It is also reported that these ovens are used for heating parts after plating, in order



to remove hydrogen, and for the storage of parts and small sub-assemblies to prevent rust and corrosion. Three sizes are offered, the smallest being 14 x 14 x 18 in., and the largest 18 x 24 x 30 in. These units are of the gravity convection type, electrically heated, though other models are available.

Horizontal Plate Filter

THE *Sparkler Mfg. Co.*, Mundelein, Ill., announces the introduction of a new series of filters for handling plating solutions, varnishes, resins, oils and similar aqueous solutions and viscous liquids. Its patented, horizontal filter plates are built up inside a completely enclosed filter tank, eliminating leakage and evaporation. The unit is engineered to be used as a diatomaceous earth filter or as a cake retention filter to be used with paper cloth or asbestos. The



pilot plant model has a capacity of 1 pint to 100 gal. per hr., and production models are available for capacities to 10,000 gal. per hr. Pressure range is up to 100 lb. per sq. in.

Protective Coatings

THE UNITED STATES STONEWARE CO., Akron, Ohio, has developed a coating, TYGON, which is available as a paint, as a tank lining material, or for molding or extruding. It is unaffected by practically all inorganic and organic acids, salt solutions and alkalies, with the exception of glacial acetic and fuming nitric acids. Its corrosion resistance does vary slightly, however, according to the type of compound used. Unlike rubber, which it resembles in many physical characteristics, TYGON is unaffected by active oxidizing agents and many of the hydrocarbons, and is immune to the effects of hydrochloric acid.



Jim Eaton's speedboat is out hunting Japs . . .

She was a sleek mahogany runabout when she stole Jim Eaton's heart at the last motor boat show. But since then she has put on weight and been painted battleship gray. She is in the Navy now, patrolling a stretch of bay along the Pacific coast—part of an enormous fleet of patrol and picket boats, mine yawls and mosquito boats to which our builders of pleasure craft have turned their world-famous genius and facilities.

American builders of power boats know the meaning and methods of mass production. When they changed from yachts and runabouts to war craft the result was, not a trickle, but a swelling stream of boats for the Army, Navy and Marines.

When problems arose they were

chiefly in adapting production methods to the new designs and special alloys required by war. In cooperation with Revere Technical Advisory staff, many famous boat builders made the change-over as smoothly as they would in producing a new model. For in addition to sound copper alloys, Revere supplies this service to help make manufacturing operations easier and quicker.

Every ounce of copper our country can produce goes directly into vital war materials. Fortunately, Revere is equipped with new plants, improved machines, advanced processes which add enormously to the nation's capacity to produce fine copper alloys. Not only are these plants working to the limit of their resources, but more facilities are steadily being added to bring the day of *victory*, still nearer.



The Revere Technical Advisory Service functions in (1) developing new and better Revere materials to meet active or anticipated demands; (2) supplying specific and detailed knowledge of the properties of engineering and construction materials; (3) continuously observing developments of science and engineering for their utilization in producing methods and equipment; (4) helping industrial executives make use of data thus developed. This service is available to you, free.

REVERE COPPER AND BRASS INCORPORATED

EXECUTIVE OFFICES: 230 PARK AVENUE, NEW YORK

Assembly Line . . .

• Auto industry answers Kindelberger claims Detroit is falling down on aircraft sub-assemblies . . . Industry must learn distinction between salvage and scrap.



DETROIT — Enthusiasms of Americans are easily whipped up in a good cause but not so easily controlled and directed. A whole series of examples has been supplied in the various scrap and salvage campaigns that this war has brought forth. Aluminum, iron and steel, and paper drives have furnished some examples. And even more recently, talk about melting up all automobile dies, including those of the 1942 models, has created a stir.

Reports that housewives threw nearly-new pots and pans into the aluminum scrap heap—and went out to buy replacements—might be matched in the current industrial salvage program if some overly-anxious laymen could have their way.

An analogy is only as good as the listener thinks it is, but one that struck the fancy of some in the automotive industry last week simply compared industrial materials to foodstuffs.

Every housewife understands that food at the market is raw material; on the stove it is "in process"; and on the table it is going into the ultimate consumer. But left-overs go either into the refrigerator—to be salvaged for a later meal—or into the garbage can. The analogy points out that, similarly, many industrial materials reach the stage where discrimination must be exercised to decide whether the material is

salvage or scrap. Just as left-overs sometimes are stored so long that they spoil and must be thrown out, materials with possible salvage value may deteriorate and become scrap.

BOOTH industry and the public face the problem of educating themselves to the distinction between salvage and scrap. Many of the smaller industrial plants are now getting that education, and so is the public. For instance, when clothing is rationed, housewives must examine every piece of old cloth to decide whether it is salvageable or simply waste material. In industry the same distinction has to be made. For instance, the automobile graveyard is really part of the scrap-collecting network and it is one of the places where discrimination should be exercised to decide whether certain parts and units are salvageable for sale or should be scrapped.

Unfortunately, uninformed public opinion has already placed a lot of pressure on industry to scrap dies, tools, jigs, fixtures and old machines. But the public must learn that to the master mechanic of a plant, these constitute his "icebox" out of which he hopes to cook up something useful in production. Only when this equipment has served out its useful life should it be scrapped.

How and when the discrimination is to be exercised is a subject of controversy. One automobile company has a very careful system of card indexing. The card is typed up for each tool, die, jig or fixture, including those for all of the older models. Once a year the cards are compared with a record that shows whether these old pieces of equipment have been used during the year, and how often. As demand for replacement parts falls off, it is indicated in this yearly comparison, so the time for scrapping the manufacturing equipment cannot escape the attention of the plant management. Currently another plant is operating under a "scrap dictator" system. One man has been appointed with full authority to make decisions on the scrapping of old equipment. It is he who decides when the master mechanic has had enough use out of tools, dies, jigs and fixtures, and orders them scrapped. It has been

suggested that the entire automobile industry adopt a similar practice and the suggestion is now under consideration.

J. H. (Dutch) KINDELBERGER, president of North American Aviation, Inc., made surprising charges last week that the automotive plants of the nation "have not delivered a single aircraft sub-assembly in 16 months." In reply, Ernest C. Kanzler, chief of the Automotive Branch and Detroit Region of the War Production Board, labeled the charges "perfectly ridiculous." The aircraft company president's statement to a group of 20 newspaper men on the National Association of Manufacturers tour of war industries was made in Kansas City just a few days before the touring reporters came to Detroit where they had a chance to see the answer for themselves.

The surprising thing about Kindelberger's statement is that he, of all aviation men, is probably the best informed on this subject of auto plant production of plane parts because the North American company, a subsidiary of General Motors Corp., has been receiving parts and sub-assemblies from the Fisher Body Division for some time.

Executives of the industry itself were prompt to answer the canard. W. P. Brown, president of Briggs, asserted: "We have been producing aircraft parts for more than a year. In most cases we have been ahead of schedule on wing sections and sub-assemblies. In fact, in certain instances we had to cut down until the aircraft plants could catch up with us."

Murray Corp. of America has already been reported as being 11 weeks ahead of schedule on aircraft shipments and at one time it heard demands that it, too, slow up on production so it wouldn't flood the west coast with parts.

Probably not the last has been heard of Mr. Kindelberger's amazing charge.

NEWSMEN themselves had a chance to visit the Ford Willow Run bomber plant and other automotive-aircraft plants during the week. At Willow Run they saw bombers on assembly lines and found out that this 16-month-old

HERE'S ONE REASON why one Yankee pilot is "worth a dozen Japs"

THE big ring is an American aircraft engine in embryo. The hands are doing a routine, high-speed inspection job — plug-gaging a hole. That's precision in the making . . . accuracy to .00010" coming up . . . one reason why American pilots will soon rule the skies of all the world.

That's a Pratt & Whitney plug gage . . . no laboratory toy, but a calloused, hard-working *production* tool that does its job and comes up smiling. Heat-treated for *enduring* service, finished for uncanny *accuracy*, it's typical of P&W precision products now building America's strength for Victory.

There's one catch: as things stand now, there are a "dozen Japs," more or less, for every well-equipped Yankee in the battle zone. *So don't spare the pressure . . . keep 'em rolling.* Your P&W tools can take it.

P&W Photo—Unretouched



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PRATT & WHITNEY

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plant already had produced its first complete bomber, in addition to shipping sub-assemblies to an aircraft plant in the southwest.

At Chrysler, K. T. Keller, president, replied to the Kindelberger charges by declaring that Chrysler's scheduled production of bomber sections has been maintained and would soon be increased 150 per cent. Keller itemized other armament projects in Chrysler plants, including more than a million cores per month for armor piercing bullets, 90,000 large shell forgings per month, and a dozen other projects that are keeping Chrysler plants operating virtually 100 per cent on war work.

Preparation for production of war goods by the hundreds of companies in the automotive industry required expenditures of approximately \$370,000,000 during 1941, according to a summary appearing in the 1942 Automotive Year Book just released by Ward's Reports, Inc., the source of much statistical information on the automotive industry. The year book estimated that approximately 1,500 automotive companies had been awarded more than \$13,000,000,000 in war contracts during 1941 and the early part of 1942.

THE most recent report on General Motors deliveries of war materials lumps together deliveries of United States and Canadian plants which show a total of \$112,000,000 in deliveries for the month of April, representing an increase of \$17,000,000 over the month of March. Deliveries in the first quarter were \$257,479,371, compared with fourth quarter delivery last year of \$158,469,698, and first quarter deliveries in 1941 totaling only \$56,619,168.

General Motors employment is reaching back toward the peace time peak. During the week ending May 2, total GM hourly rated factory employment in the United States was 185,446. The average number of salaried and hourly employees on the company's payroll during April was 235,000.

Latest authorized report on new war goods in production is that the Ford River Rouge plant is in production on 30-ton medium tanks. They are to be driven by a V-8 motor, generally understood to be an adaptation of the 12-cylinder, V-type liquid cooled motor which

Auto Industry Drafts Scrap Plan

Detroit

• • • The Automotive Council for War Production announced late last week that a plan has been drafted to speed immediate movement of the maximum amount of iron and steel and other scrap from the industry to the steel industry. P. O. Peterson, of Studebaker Corp., has been appointed chairman of a committee to prepare an industry-wide program. Others helping him will be J. D. Porter of Federal Motor Truck Co.; B. D. Kunkle of General Motors; Ray Ayer of Chrysler Corp.; J. E. Padgett of Spicer Manufacturing Co. and J. F. Page of Packard.

The plan will include not only automobile companies but also their dealers and suppliers. It will be geared to the national salvage campaign scheduled to start June 15.

Ford has under development for aircraft.

This is the engine which was designated for manufacture with Ford automotive production equipment. It was designed to fit the machines, so new machines would not have to be designed to fit the job.

Union Looking for National Wage Confab

Cleveland

• • • Representing some 660,000 steel workers, the 1700 SWOC delegates who assembled here to adopt the new name "United Steelworkers of America," were informed by their wage scale committee that a "national conference with all of the steel industry for the purpose of perfecting a national collective bargaining agreement for the entire basic steel industry" was likely to follow the settlement of the "Little Steel" case now before the National War Labor Board.

Such "industry-wide collective bargaining" would be for the settling of such questions as the standardization of occupational wage rates, "premium pay for afternoon and night shift work," and probably to discuss the elimi-

nation of the "Southern wage differential," the payment of equal pay for women hired to replace men workers, the participation of union representatives in the establishment of wage incentive systems, the elimination of the wage inequality suffered by coke plant and blast furnace workers, improved vacation plans, additional holidays where possible without interrupting steel production, seniority, hours of work, and grievance adjustment machinery.

The number of questions remaining to be settled and the fact that there are still 850,000 workers in steel, tin and fabrication plants to be organized, bear out Philip Murray's statement that much work remains to be done by the union. To perform this work, the international office of the union will collect 75 cents out of each member's monthly \$1 dues and \$2 out of the per capita \$3 initiation fee, with union locals getting the balance. Income from dues alone will yield the union headquarters \$475,000 a month or \$5,700,000 a year. The newly elected president, Murray, pointed out that the union needed strong finances to combat its enemies and that "\$1,500,000 has been saved for a rainy day." He estimated the union's expenses in the vicinity of \$330,000 a month. Murray's salary will be \$20,000 a year, and three other officers will receive \$12,000 each annually.

The exceptionally orderly convention adopted a democratic constitution, reiterated demands for a \$1-a-day wage increase, the "closed shop" and the "checkoff," reminded itself of anti-labor actions and passed some 27 resolutions, many of them world-wide in scope and others of a Utopian nature.

Union officials mentioned the coming elections at National Tube Co. on June 5 and at Carnegie-Illinois on June 12, warning members that the union "is not going to take a chance of losing an election at any plant," and will not hold an election if defeat is likely. The union also looked forward to an early signing up of American Rolling Mill Co.'s employees, and called upon the seamen manning the U. S. Steel ore fleet to join the National Maritime Union of the CIO.

How to Conserve Stainless Steel and Increase War Production!

When you were turning out war equipment and parts in smaller numbers, Stainless Steel scrap losses in fabrication involved fewer pounds of vital metals. But now that output has leaped into mass production, scrap losses must be reduced to an absolute minimum.

With nickel and chromium so precious to our war needs, it is vitally important that you *check your fabricating methods at every point*. Waste is terrifically expensive in loss of time and strategic materials.

Helping to get the most out of every pound of Stainless Steel is a part of Carpenter's Wartime job. The knowledge and experience we have gained from pioneering the fabrication and use of Stainless Steels is now being offered to you. Let your Carpenter representative help you check your tools, dies and lubricants—to make sure your set-up is right for maximum production from a minimum of material. Meanwhile, here are specific suggestions to help you speed war production and conserve material. Be sure to check these points in your plant now! Time is short.



✓ Check your Physicals

Find out if you can take advantage of the natural strength of Stainless by using a lighter gauge strip. Often, an embossed rib can be used to add strength, allowing the use of lighter gauge stocks. Still another way to speed war production is to make sure that each order to your supplier is complete—from physical specifications to priority information.

✓ Check your Scrap Losses

If you are blanking, forming or drawing parts from sheet, find out if using a narrow strip could *eliminate slitting* and reduce your scrap loss. One plant reported a 40% material saving by adopting strip to the specified width for the particular part. Jobs were laid out more economically, and time spent handling material was reduced. The accurate gauges and tolerances of Stainless Strip save wear on dies and reduce rejects.



✓ Check your Rejects

If your rejects are high, it's time to start checking all along the line. Material too much *undersize* can cause wrinkling in the die. *Oversize* material may explain galling and tearing. Check your tool layouts, die clearances and lubricants. And if your scrap pile continues to show a high percentage of rejected parts—it's time to call in an expert.

THE CARPENTER STEEL CO., Reading, Pa.



The Carpenter Stainless Selector Slide Chart can give you quick answers to your questions on the grades of Stainless to meet your requirements. It shows the machining, heat and corrosion resisting properties of each analysis of Stainless Steel. A note on your business letterhead will bring you a Slide Chart—free to Stainless Steel users in the U. S. A.

Carpenter STAINLESS STEELS

BRANCHES AT Chicago, Cleveland, Detroit, Hartford, St. Louis, Indianapolis, New York, Philadelphia

Washington . . .

• War industry expansion likely to be selective from now on . . . One airplane assembly plant, built to produce 50 planes monthly, now turning out 150 . . . Munitions production now said to be exceeding highest hopes.



WASHINGTON — Whether over-expansion will result from the carrying out of the program for \$13,000,000,000 worth of federally and privately financed war construction as some WPB and Army officials think, WPB's material requirements survey, according to a majority of the war agency's policy makers, gives the answer. Projects are being reviewed with time required to complete, and the amounts of critical materials needed as the determinants of whether a plant is to be deferred or completely abandoned. Deferment or abandonment will be ordered, only if the material saved can be channeled directly into manufacture.

As against a much higher percentage estimated by some the total curtailment according to one source may not mount above 15 or 20 per cent, and raw materials expansion programs, particularly in steel and its alloying metals will be cut least. Material men express the opinion that 6,000,000 or 7,000,000 of the original 10,000,000 tons of iron and steel expansion approved by SPAB may be achieved by June 30, 1943. Expansion in magnesium, tungsten, cobalt, and chromium will be carried forward, it is said. And the total of plants in units and dollars, which may have to be abandoned, may be eclipsed by further expansion

in the selected lines of synthetic rubber, high octane gasoline and aluminum. Armament plants may be deferred to some extent.

THE anti-expansionists within WPB and the War Department take the view that munitions production is now exceeding most sanguine hopes. The case of an airplane assembly plant built to assemble 50 planes a month is cited. The present output of this plant is 150 planes per month. It is reported that there are excesses in certain lines of machine tools, that our much discussed shortage in steel is only a matter of unbalanced capacities, and priority inflation.

It is held by this group that the plate scarcity can be wiped out by existing rolling capacity, if only enough other flat rolled products are dislocated. They point to the United States Steel Corp. conclusions to this effect and condemn WPB top officials for not forcing the Maritime Commission to accept plates from converted strip and universal mills. Maritime has been adamant in its refusal to use narrower and thinner plates except for a few of the E-2 model boats. It is also claimed that there may soon be more than adequate production of vanadium and this point is made by separate and disinterested government agencies such as the Federal Power Commission.

Anti-expansionists maintain with some force that the duration of the war is unknown, and that expansion plans were made without measurement of the country's productive capacity, and were set forth before it was thought that peace industries could be converted to any great extent.

The objection is made that material requirements are not known now, that the Army and Navy have never made their needs clear, that much of the specifications demanded by the armed services and allied countries in alloys could be changed to lower alloy content. Proper heat treating is proposed to give the equivalent tensile strengths.

There is a feeling that if the war were to end suddenly, the country would be dotted by many partly completed plants, and finished plants for which raw material



Harris & Ewing Photo

SUCCESSOR TO BATT: A. I. Henderson has been named Director of the Materials Division of WPB, succeeding William M. Batt.

would not be available to manufacture into munitions.

NEEDED plant expansion is reported to be lagging because many of the expansion programs were initiated simultaneously, creating concentrated needs for scarce materials, and developing choke points with consequent stoppages. The upshot is that there is a wide belief among officials that deferment of other projects to complete these plants is necessary to the balancing of expansion.

It is argued that tanks, guns, ships, etc., are needed this year, and that the whole material picture has been clouded by the indiscriminate issuance of priority ratings by the Army and Navy Munitions Board, the supply services of the Army, and the Maritime Commission. It is felt that the lack of centralized control of priority ratings, resulting in priority inflation, may

BUILD BETTER HEARTHS FASTER *with* RAMIX



Large photo, above: Ramming bottom in new furnace. Note opening left in backwall for chuting in Ramix.



Small photos, below: Ramming banks behind wooden forms, after completion of flat. To save time forms should run entire length of furnace.

Basic Refractories for the Steel Industry:

MAGNEFER — Dead-burned dolomite for hearth and slag line maintenance.

SYNDOLAG — Dead-burned dolomite, smaller in grain size than Magnefer.

BASIFRIT — Quick-setting magnesia refractory for new construction, resurfacing and maintenance.

OHIO MAGNESITE — Domestic dead-burned high-magnesia grain refractory, equal to Austrian.

HEARTH PATCH — For deep hole patching and other quick repairs in the basic open hearth.

RAW DOLOMITE — Washed open hearth dolomite in rice size and standard $\frac{3}{8}$ -inch.

GUNMIX — A basic refractory with chemical bond, sized for use with a cement gun.

RAMIX — An air-setting basic refractory for rammed hearths and cold furnace repairs.

695 PLASTIC — Strong plastic basic refractory for hot and cold repairs.



HIGH-GRADE PREPARED REFRACTORIES FOR THE CONSTRUCTION, MAINTENANCE AND REPAIR OF BASIC OPEN HEARTH AND BASIC ELECTRIC FURNACE HEARTHS

● Ramix is an open hearth time saver, first aid to war production. Cold-ram a new bottom with this refractory and you'll be making steel a week to ten days earlier than if you had burned in the usual magnesite-and-slag hearth.

Not only time, but skilled labor, is saved. Because it is rammed in place by common labor, a Ramix hearth can be completed and put into production with minimum demand on the time of your experienced furnace operators.

Ramix is a scientifically bonded, high-magnesia refractory, manufactured under close laboratory control. The bonding elements used stabilize the magnesia against the hydration that so often occurs in grain magnesite hearths and in magnesite brick during periods of prolonged shutdown. The practical value of the built-in properties of Ramix is being proved daily in service in more than 150 hearths. Tempered with water and rammed in place, it consolidates into a hard monolith. It bonds well with brick and other bottom material. Under temperature, it develops into a dense, homogeneous structure that is not readily attacked by slag or metal, and requires a minimum of maintenance and repair through a long life.

Let our service engineers figure with you on Ramix for your next hearth job.

BASIC REFRACTORIES, INC.
FORMERLY BASIC DOLOMITE, INC. CLEVELAND, OHIO

be an important reason for apparent material shortages.

It is a fact that the steel mills are jammed with directives and A-1-a rated orders and it does not necessarily follow that there is a serious finishing capacity lack just because directives and priority ratings have been issued for double the amount of material which could be possibly rolled.

There is a general feeling that it more nearly means WPB has abdicated its powers to the Army, the Navy, the Army and Navy Munitions Board and the Maritime Commission and the whole war machine is running without a governor. Complaint is made that WPB orders lack clarity. One wag cracked that they read the same backward as they do forward.

It is true to a limited extent that expansion that is non-essential, such as hydro-electric power, to use about 40,000 tons of steel, has been approved in keeping with the administration's socialistic power policy. A few plants have been built on a luxurious material scale, and some have not been selected with a view to minimizing the requirements for the cost of bringing in

utilities, and the relative nearness of roads, railroads and housing. This is another anti-expansionist argument.

The majority of officials at WPB who are expansion minded are conversant with all of these factors, but say that it is better to over-expand in the event that this is a long and hard war than to under-expand and not have enough war material and other armament. It may be that expansion deferment which they advocate could furnish a way of saving face, and that some building may be permanently deferred.

Cautious business men within WPB say the only sound way to revise the program is to take as accurate and as thorough a measurement of the country's productive capacity as is possible while the war continues and set some feasible limit to the number of weapons required to win it. All priorities power should be lodged in WPB, they contend, and the issuance of priority ratings should be discontinued until the industrial inventory is complete. Meanwhile, industry can go on producing weapons under existing contracts at an

accelerated rate until the confusion is lessened.

No good can be accomplished, it is pointed out, by reviewing the engineering plans of the building already approved without the overall productive picture, and the number and kinds of weapons desired. It is added that no cut back or continued expansion unless on this basis is sound.

To the argument that over-expansion will cause waste and depression of material prices, the answer is given that the primary end of war is waste not only of material but manpower, and that it is unavoidable.

The government has built the war projects on a cost plus basis and the abandonment of any project is going to cause either a loss of the cost of engineering or materials and labor. The government may cancel its contracts but it has bought plant sites of which it will have to dispose. The question is whether proper curtailment before plants are begun is less costly than letting the whole program go forward with only a cursory examination.

Ford Bombers Powered By Buick-Built Plane Engines

Detroit

••• When Ford bombers leave the assembly lines of the Willow Run plant, they are powered by Buick-built aircraft engines, it has been disclosed officially by the War Department as an example of the extent to which automobile manufacturers are cooperating.

The engines are a high-powered Pratt & Whitney type built under license by Buick which recently announced that it is a year ahead of production schedules and is shipping engines in trainload lots to several airplane manufacturers, including Ford.

Copper Recovery Corp. Will Buy Frozen Stocks

••• Copper inventories, frozen by WPB conservation orders, will be purchased by the Copper Recovery Corp. at prices ranging from 15c. to 30c. a lb. WPB states that it proposes to provide a fair and reasonable return to owners, and will purchase fabricated copper products at prices up to two and one-half times their value as scrap.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



30 Merchant Ships Launched on May 22

Washington

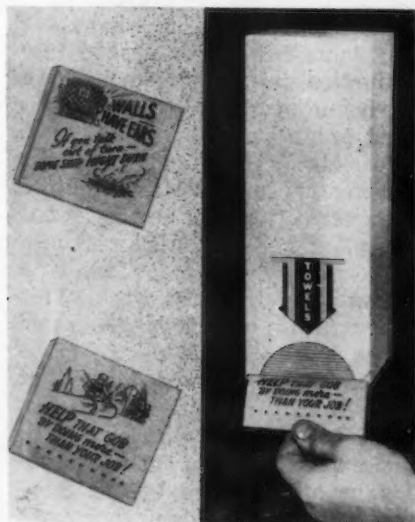
• • • An all-time record of mass launching of merchant ships was set on National Maritime Day, May 22, when 30 cargo vessels of all types went down the ways of 19 shipyards on all coasts and the Great Lakes. Pacific Coast yards led in the launchings, four yards sending down 11 ships. Three of these yards had triple launchings. On the Atlantic Coast seven yards launched nine vessels. Six Gulf yards launched eight ships. Along the Great Lakes each of two yards launched a vessel.

No More Solid Brass Buttons for Army

Washington

• • • Metal buttons on Army uniforms will be made of steel and zinc, coated with brass hereafter, the War Department announced on May 22. It is expected that millions of pounds of metal will be saved by this move, as military buttons were formerly solid brass.

TOWEL TALKS: The paper towels, made by Precision Paper Tube Co., Chicago, from this dispenser serve, in addition to being a drying medium, as a dispenser of information. Safety rules, rumor cautions, pep talks and boost production messages are printed on them to be read by the user.



CHECK All Dimensions Simultaneously

If you are inspecting parts in large volume, having two or more critical dimensions, the Sheffield Multichek will permit you to:

- 1 Greatly reduce inspection time and release skilled inspectors for other work
- 2 Increase the accuracy of inspection
- 3 Increase out-put per inspector
- 4 Use unskilled inspectors or checkers
- 5 Reduce floor space devoted to inspection



Some of the Parts Now Being Inspected by the Sheffield Multichek

SHELL BODIES • TIME FUSES
CARTRIDGE CASES • PISTONS
ARMATURE SHAFTS

ALL THESE DIMENSIONS
ARE CHECKED IN ONE PASS
INSTEAD OF NINE

- | | |
|-----------------|----------------------|
| A | F |
| Overall Length | Flange Thickness |
| B | G |
| Body Diameter | Counterbore Diameter |
| C | H |
| Body Diameter | Counterbore Depth |
| D | J |
| Flange Diameter | Primer Hole Diameter |
| E | |
| Shoulder Height | |

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Descriptive Literature

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Formerly—The Sheffield Gage Corp.

Gage Division • DAYTON, OHIO, U.S.A.



WEST COAST . . .

• Problem of obtaining storage space is more difficult . . . Douglas Aircraft adopts use of conveyor belt for sub-assemblies . . . First units of two aluminum plants operating.



SAN FRANCISCO—Decentralization of plants and offices is the latest plant protection trend in southern California. One principal aircraft manufacturer has removed all engineering data from its main plant so that if it were destroyed engineering material would remain intact. This firm has rented space in many Los Angeles office buildings for various clerical departments. Small plants supplying parts and sub-assemblies are scattered all over southern California.

Another plane manufacturer is warehousing material as far as 20 miles from its main assembly plant. Scattering of warehouses is not entirely a matter of choice. Warehousing of military supplies for shipment throughout the Pacific war theatre and for military forces stationed on the Pacific Coast, itself an official combat zone, has resulted in requisitioning of all normal warehouse space and in addition many facilities not originally intended for warehousing such as automobile showrooms. New and growing industrial concerns which do not have their own adequate storage facilities are faced with a very real problem particularly because of the reluctance of government lending and financing agencies to regard warehousing as a part of the production process.

Depleted stocks of steel warehouses have made it possible for several to be put to other use. Columbia Steel Co. is no longer

occupying the large new steel warehouse it built in Seattle, and for the duration of the war will restrict its warehouse activities to its smaller original structure. The importance of this step is emphasized by the fact that Columbia, United States Steel Corp. subsidiary, has no mills in the Pacific Northwest and must meet competition from its warehouse stocks. A. M. Castle & Co., whose Seattle office and warehouse have been taken over for war uses, moved their office downtown and took warehouse space for the duration at the large Bethlehem Steel warehouse.

DOUGLAS AIRCRAFT now has in operation at one of its principal southern California plants a conveyor belt for sub-assemblies which it says has increased output, decreased spoilage, and made more effective use of working time and energy.

Operating through all shifts, the belt moves at a speed so timed that each part placed on it arrives at the working position at the right time. Parts and materials for each job are brought from the stockroom at the starting end of the conveyor. They are tagged with numbers of the stations at which they must be taken off for required operations when placed on the belt.

Each man along the line specializes in a certain task. The leadman can easily determine whose work was faulty in the case of any rejected part. This has an educational advantage. The leadman can explain what had been done wrong and avoid future mistakes and spoilage. Reworks in this department are now but one-tenth of what they were before the establishment of the moving conveyor belt.

It has also facilitated the training and absorption of new employees. The breaking-in period of an unskilled worker is greatly reduced, for he has but a single job to do on the mechanized line.

Some persons in the aircraft industry look for freezing of workers to their jobs soon, but believe that, in southern California, exchange of employees between companies will be made to facilitate transportation. The Los Angeles industrial area, probably as sprawling as any in the world and extremely spotty, has

contributed to much heavier than usual dependence upon automobiles as a form of worker transportation. Plans to supplement or supplant this by interurban trains involve not only more rolling stock but extension of line, posing a knotty question as to whether materials can be legitimately assigned.

RESTRICTION of industrial expansion to conserve critical material probably will do no more than make official a trend evident in the far West for some time. Even in such vital industries as aircraft, wood frame structures have been increasingly used wherever possible. In the construction of new Pacific Coast shipyards, steel has given way to wood not only to conserve material but in the interests of quicker construction. Shipyard prefabrication shops currently designed for steel probably will be affected by the restriction order, however.

First units of two Pacific Northwest aluminum reduction plants have recently gone into production, indicating that the construction phase of announced aluminum reduction capacity in that area has been completed. At one of the plants carbon for pot linings and electrodes are being shipped from other plants of the operator, located on the far side of the Rockies, until construction of a local unit can be completed. Another actual production unit of this plant is scheduled to go into operation in about one month; at the other aluminum plant the second unit is slated to go into production in about a fortnight, and the third unit by August 15.

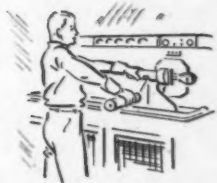
There is no doubt but what these two plants have been pushed into production in record time. Both are being operated by an experienced producer.

Possibly subject to closer scrutiny as to materials required for construction will be the aluminum plant in California's northern San Joaquin Valley for which a site was acquired last week. This plant will use electricity generated at the hydro-electric plant of the city of San Francisco located at Hetch-Hetchy near Yosemite.

The far Western portion of the steel expansion program will probably be affected less by the stop-construction order than other parts

**2100° F.
IN 13 SECONDS!**

TOCCO heats shell forgings so fast they can be handled without tongs!



Another vital armament job being speeded and improved by TOCCO Induction Heat Treating:

Here, TOCCO heats the open end of shell forgings—to 2100 degrees F. in 13 seconds—so fast the shell body remains cool and can be handled to the nosing press without tongs. Heat is localized in section to be forged.

Boosts output. Compared to former method, TOCCO speeds up heating and handling. Reduces hazards.

Minimizes scale formation. Increases die life.

Improves operation. TOCCO controls the heating period to 1/10 second, automatically. Assures uniform temperature and uniform length of heated zone.

Machine is clean and cool. Occupies space only 7 ft. x 5 ft. maximum. Pre-set controls. Simple push-button operation; doesn't require skilled labor.

TOCCO is a standard unit. Can be adapted to post-war jobs by simply changing work fixture.

Investigate TOCCO today for speeding up and improving your hardening and heating!

**THE OHIO CRANKSHAFT COMPANY
CLEVELAND, OHIO**

**SPEEDY ELECTRIC HEAT IS GENERATED WITHIN
THE SECTION TO BE HEAT-TREATED**



JUST PUSH A BUTTON

TOCCO

World's Fastest, Most Accurate Heat-Treating Process



of the country because of the desire to make this section as nearly self-sufficient as possible. The integrated steel plant being erected by Defense Plant Corp. in Utah, for operation by Columbia Steel Co., definitely will not be affected and will be rushed to completion as soon as possible those in charge believe. This plant, known as the Geneva Works, is being counted on to provide the pig iron which will enable mills located at tidewater to continue operations without curtailment. Should work at the Geneva plant be abandoned or postponed, Coast mills would face a severe curtailment early in 1943.

Defense Plant Corp. is also erecting beehive coke ovens in Carbon County, Utah, from which Columbia will supply its expanded current pig iron operation at Provo. A coke operation of this type might be subject to construction deferment could substitute sources be developed elsewhere.

FOLLOWING its normal pattern, the opening thrust by the CIO United Automobile Workers in its efforts to organize Douglas Aircraft Co. is the filing of charges with

NLRB that Douglas discharged the president of the UAW local for union activity. Under the National Labor Relations Act, such a discharge would be an unfair labor practice. Douglas entered into a consent decree with NLRB late in 1939 in which it promised not to discourage membership in the UAW or discharge or discriminate against any of its workers. The union declares that this decree is still in force and that the present discharge of the union officer should place the company in contempt of court.

It may be too early to pass final judgment, but until such time as sincere criticism becomes high treason any West Coast correspondent who pretended that the War Production Board, locally is winning a place of esteem in the hearts of production men would be dishonest to his readers and derelict in his duty. The regional and district offices in the Coast cities, were they part of even a second class industrial concern, would no doubt be immediately liquidated and replaced. At the root of most of the criticism of the War Production Board offices here is the obvious

fact that they are over-organized. Topping this handicap is the fact that a large portion of the personnel has been drawn from the ranks of unemployed or retired executives, who are as unfamiliar with current business practices as with the task they are assigned to carry out.

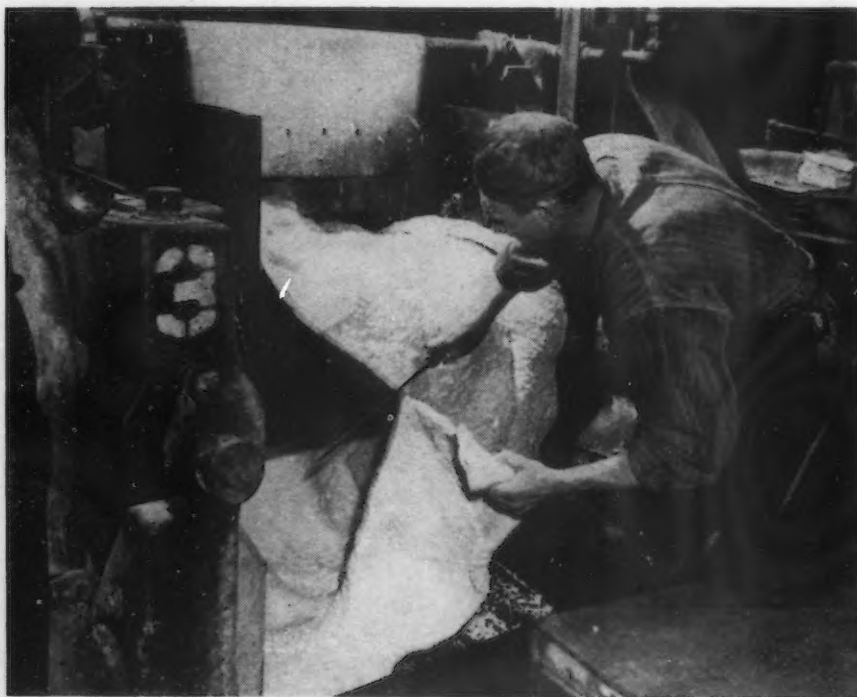
Typical of the agency's entire functioning is the way expansion of its San Francisco office space has been carried out. Since the War Production Board descended upon the newest building in town nearly six months ago a crew of men have been kept busy doing nothing but tearing down partitions and replacing them in different formation, although private business had previously been able to operate there with a minimum of such work. In the regional offices of the General Salvage Section of the Bureau of Industrial Conservation, during one week, a partition was torn out, turned at right angles to its original direction, then torn out again and returned to its original position. It is a fascinating process to watch, guessing what the final outcome will be, and when the Section will be able to give consideration to its salvage activities.

Most business concerns feel it is politic to at least give lip service to the War Production Board, for, although it apparently has little ability to help them, it has shown it can be extremely destructive to those who express their doubts publicly. During the last days of the OPM, most Coast firms who could afford it secured some form of Washington representation when it became apparent that Coast offices could not act let alone finally interpret priority matters. Since the creation of the War Production Board the shortcomings of the Priorities Bureau seem small compared to the other divisions which have sprung up to rival the WPA at its worst.

Two months have passed since WPB announced it would appoint regional directors to be given at least a share of responsibility and authority. Not only has none been appointed for the Pacific Coast regions during that time but a petty behind-the-scenes dispute has grown up between northern and southern California as to which region should supply the man who is to help this part of the country win the war.

SYNTHETIC RUBBER: Here is some synthetic rubber in the making, but John Q. Public cannot expect any of it to be made into tires for his family omnibus. Experts say this excellent synthetic rubber will not run over 40,000 tons in 1942, which is just about 5 per cent of U. S. rubber requirements.

Harris & Ewing Photo





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· N. Y.

Fatigue Cracks

BY A. H. DIX

Come with Me To Macedonia

• • • The thinner our hair gets the more we incline to the belief that a run-of-mine mind with full facts is more likely to make the right decision than is a genius whose evidence on a given case is patchy.

Until a few days ago we thought this was an original discovery, but have just learned from Sloss-Sheffield's excellent "Pig Iron Rough Notes" that the same idea occurred to Lucius Aemilius Paulus back in B.C. 168. As the MacArthur of the day he was given the job of conducting the war against the Macedonians. Before setting out he addressed himself thus to the ginmill generals:

If anyone thinks himself qualified to give advice respecting the war which I am to conduct . . . let him come with me into Macedonia. He shall be furnished with a ship, a horse, a tent; even his traveling charges shall be defrayed. But if he thinks this too much trouble and prefers the repose of a city life to the toils of war, let him not, on land, assume the office of a pilot . . . we shall pay no attention to any councils but such as shall be framed within our camp.

And Lo! About Ben Adhem . . .

• • • In business, or war, or in bidding a bridge hand a hunch may occasionally outweigh a fistful of facts, but the law of averages is against it. We are happy to see that in more and more cases advertisers are selecting their advertising mediums on the basis of evidence obtained from you as the user instead of us and our contemporaries as the sellers. We try reasonably hard to be unbiased, but unconsciously we may at times magnify both our own virtues and our contemporaries' faults. To substitute cold fact for wishes there is nothing like a questionnaire reading, "Which publication do you prefer?"

We just saw the results of an extensive survey of this kind, and your favorite family journal led the league as usual.

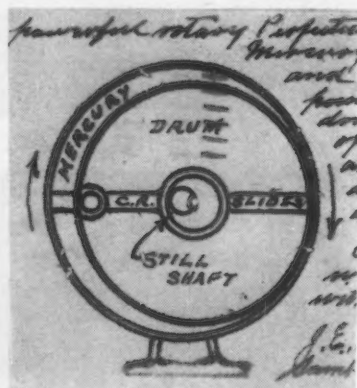
Why It Goes Nobody Knows

• • • When we were among the cloak-and-suiters over on West 39th St. there was hardly a week went by that someone didn't pop in with a surefire perpetual motion device. But either the p. m. people don't get over to the Grand Central neighborhood or the I-dreamt-that-I-dwelled-marble-halls atmosphere of our lobby scares 'em away; for we haven't seen one in a year.

The only offer we have had lately is this one that came in by post-card:

A powerful rotary perpetual motion with mercury between cylinder and drums gives 27,000 lb. pull in 4 ft. by 1 ft. drums, two abreast and opposed. Torque begins at horizontal, max. at vertical—double action.

Just the thing for plans to abolish warships, along with the Axis?



—J. E. Bissell, St. Augustine, Fla.

The terminal question mark is Mr. Bissell's, and frankly it frightens us a little. There should be no question mark in the mind of a perpetual motion machine inventor. Nevertheless, we are passing Mr. Bissell's idea along, in the hope that someone in the Navy or the Maritime Commission will see it. If this wins

the war all we ask as our reward for being the middle-man is that the government will tell us confidentially what keeps the mercury going round and round.

Lost Opportunity

• • • Our brains department's back is calloused from the pats it has received over its happy tilting of news photography. So it can well do with an exception, as filed by your favorite family journal's v.p. and g.m., Charles Samuel Baur:

Instead of "Commodity Price Freeze," shouldn't this photo of Leon Henderson been captioned, "Price Administrator Scans Ceiling?"

It should.



Stopper

• • • We like the ad the *New York Times* is running in the advertising journals, headed, "Are you the guy that will be forgot by the gals you leave behind?" It starts, "Tough spot, that. And worse for a business than for a bombardier. Break a soldier's heart and another gal will soon mend it. But for a business, to be forgot is fatal."

But we still prefer the original, written by our pres. and ed. John H. Van Deventer, under the title, "The Girl He Left Behind Him." It read in part:

The boy who went to war was too wise to believe in the old proverb, "Absence makes the heart grow fonder." . . . So he carried out a campaign of promotion to keep from becoming the forgotten man. . . . That letter she got from him every week or two kept her thinking about him and kept her from thinking too much about the temporary beaux who took her out in the meantime

From there on the advertising analogy was developed, so potentially that the demand for reprints ran into the hundreds of thousands. We're all out of copies now, but we ought to get some more as the point it develops is even sharper today than it was when the editorial originally appeared—on Sept. 26, 1940.

Slogans

• • • I have just been reading your Feb. 19 issue and notice you refer, as perfect, to the slogan, "The man who is lax is helping the axis." My colleagues and I think, however, that if it were altered to read "The man who lax is, is helping the axis," the adjective would be more truly justified.

—G. Ashbee, A.M.Inst. C.E.,
Fraser & Chalmers Engineering Works,
Erith, Kent, England

At a time like this, when harmony among our allies and us should be promoted at all costs, we would like to stretch a point and agree with Mr. Ashbee and his colleagues. But we find our elastic limit is exceeded, for we think "The man who lax is, is helping the axis" is awful. It lacks balance and swing; it calls for an awkward midsentence pause, and it has a confusing repetition of the auxiliary verb.

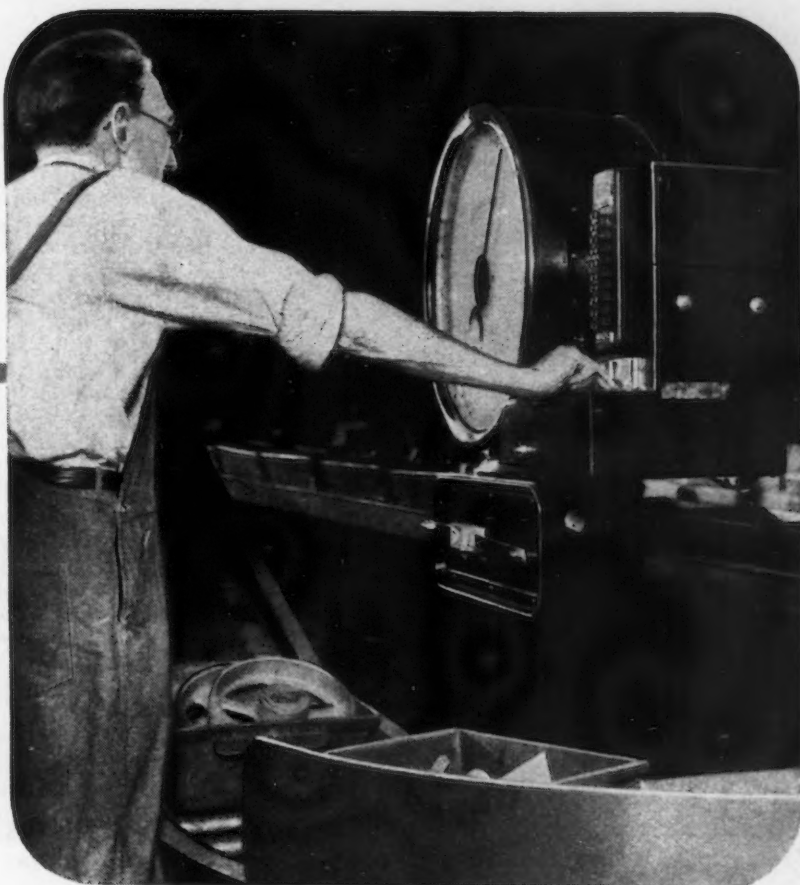
We do not claim that our own form, "The man who is lax is helping the axis," is flawless, for "lax is" and "axis" are not perfect rhyming mates, unless pronounced with a Teutonic accent—"The man who iss lax iss . . ." But that detracts from the sentiment, so we will let it stand.

Puzzles

The seven guests in last week's restaurant met in 420 days. C. W. (Braeburn Alloy Steel Corp.) Schuck takes the rap for this:

A number consisting of eight digits, beginning with 1 and ending with 9, when multiplied by 9 yields a product the sum of whose digits is equal to 9. What is the number?

America Fights the Clock with These Scales!



PRECIOUS minutes can be saved with modern Fairbanks-Morse Scales.

This scale, installed in a conveyor system, is weighing castings on the move. At the touch of a button castings are weighed without stopping and a printed record is made!

Use your priority to secure Fairbanks-Morse Scales that will not only save time *now*, but in years to come. Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago, Illinois.

FAIRBANKS-MORSE



**SCALES
DIESELS
MOTORS
PUMPS**

Dear Editor:

HISTORY REPEATS

Sir:

We would appreciate it very much if you could furnish the writer with two reprints of the editorial, "History Repeats," appearing in the May 21 issue of THE IRON AGE.

F. J. McNIFF,
Purchasing Agent,

Atlas Tack Corp.,
Fairhaven, Mass.

Sir:

I would like to get 25 reprints of the article, "History Repeats," which appeared in the May issue of THE IRON AGE.

THOMAS I. S. BOAK,
Works Manager,

Winchester Repeating Arms Co.,
New Haven, Conn.

Sir:

It will be appreciated if you will forward this office two copies of the Priorities Guide, Fifth Edition.

EDWARD J. GOLDIE,
Army and Navy Munitions Board,
San Francisco

SCRAP SHORTAGE BOUQUET

Sir:

I have been a reader of THE IRON AGE for the past few years, but until recently I have not realized how essential this magazine is to anyone interested in the steel industry. In connection with a research topic, "The Shortage of Scrap Iron," I have found it the most up to date and most informative magazine of its type.

Therefore, it is with the utmost sincerity that I congratulate you on the high standards set by THE IRON AGE.

MARKHAM J. McENROE,
Chicago

INDUCTION BRAZING

Sir:

In your issue of May 7, Page 71, you illustrate a machine for induction brazing, showing the Thermonic Induction Heating Corp. as the manufacturer.

We would like to get some literature from this company, but we are unable to find their name in the trade index.

J. D. CUMMING,
Coordinator,

Petroleum Wartime Shops,
Toronto, Canada

• Maker is the Induction Heating Corp., 389 Lafayette St., New York.—Ed.

AMERICAN-GERMAN STEELS

Sir:

Is there a comparison chart comparing American Standard Types of Steels with German Types of Steels?

OTTO GUTTMANN,

Long Island, N. Y.

• No comparative chart is available.

As regards German steels, the D-I-N specifications were fairly readily available before the war, but have doubtless changed much since that time. We do not know where the new specifications can be obtained in this country.—Ed.

PERMANENT MOLD CASTINGS

Sir:

We would appreciate very much receiving two copies of THE IRON AGE of April 23, 1942, as we are very much interested in the article on aluminum permanent mold castings on pages 36 through 42.

We note this was written by E. G. Fahlman and Herbert Chase and would appreciate your advising whether they are with the Aluminum Co. of America or with some other permanent mold concern.

A. J. KIRSTIN,
President,

National Aluminum Manufacturing Co.,
Peoria, Ill.

• Herbert Chase is a consulting engineer, at 31 Fife St., Forest Hills, L. I. E. G. Fahlman is works manager of a western company doing considerable permanent mold casting. Write him care of us and we will forward your letter.—Ed.

TOE CALK STEEL

Sir:

As manager of the "M & G" Racing stable, I have found it difficult to secure some 20-ft. bars of "Toe Calk Steel" for the shoeing of the stable members. We have a "B-1" priority certificate from Washington, but the company that has supplied this steel in the past, seems unable to make a delivery.

Inasmuch as this steel will be withdrawn within 90 days, we would like your kind assistance in giving us a little information.

Could you give us a list of some companies and their addresses, who make or distribute this type of steel?

P. W. BURROUGHS,

Warsaw, N. Y.

• Try the steel warehouses. You might also present your problem to the War Production Board, Iron and Steel Division.—Ed.

ELECTROLYTIC SILVER POLISH

Sir:

In your magazine, issued April 9, 1942, on page 54, there was an article on Electrolytic Polishing of Silver. Please furnish the writer with the name of the proper parties to contact in order to investigate its commercial possibilities.

W. W. HUNLOCK,
Chemist,

Gerity-Adrian Mfg. Corp.,
Adrian, Mich.

• The article was an abstract of a paper presented before the Electro

Chemical Society. A copy of the complete paper can be obtained by addressing the Society at Columbia University, New York.—Ed.

JAP MAP

Sir:

We would like to reprint in the Seattle Times your map showing industrial targets on Japanese Islands. If this is permissible would you please air mail us two copies of this map and bill us your charges?

F. A. BLETHEN,
Vice-President,

The Seattle Times,
Seattle

CASUALTY

Sir:

This is Thursday, May 14, 1942, and I have just read your editorial in the last issue of the industry's bible. Being a really little fellow, the shoe fits and it is so timely since we are closing our doors May 16 for the duration. There is no help for us and we are not looking for sympathy. It is just a case of circumstances.

For forty-one years we have been manufacturing Greenhouse supplies out of cast iron and steel, a line highly specialized and known only to the greenhouse trade. No greenhouse building nowadays; consequently, no business, and anyhow, steel and iron are not available. So what?

Well, one of our boys is serving in the Air Corps and is in Australia, others have found places in defense factories, some are unemployed, and I will soon be milking cows. The big boss will get along somehow if he can get enough gas to get home from Florida.

Mars doesn't seem to need us, but it's kinda tough to break up shop keeping after serving thirty-two years. Your editorials are great.

Just let our subscription die the expiring way.

E. J. MARTIN,
Manager,

Advance Co.,
Richmond, Ind.

ACOUSTIC FENCE

Sir:

I made several prints of an article appearing in the April 9 issue concerning an "acoustic fence" and sent them to various department heads who I thought might be interested in this matter. One department has expressed interest in this and has asked that I secure additional information concerning it.

Would you, therefore, please notify the writer of the name of the company manufacturing this device so additional information can be secured direct.

GEORGE P. GENTRY,
Manager, Materials Div.,

Phillips Petroleum Co.,
Bartlesville, Okla.

• The manufacturer is Automatic Alarms, Inc., Youngstown, Ohio.—Ed.



Forget the Danger of
SURGE*
in Valve Springs

* **Surge**—the extra stresses which result when the vibration frequency of a rapidly oscillating spring coincides with its natural frequency.

To reduce the dangerous effects of surge, valve springs must be specially designed and carefully fabricated. Rigid tests are equally important, and Muehlhausen engineers use a machine of exclusive design for this purpose. Typical operating conditions are created, and springs are

then oscillated at all speeds—from idling to "wide open" motor. At the same time, stroboscopic equipment is used to "stop motion"—and permit visual study at all stages. Thus, any tendencies toward surge are quickly detected.

You can always depend upon Muehlhausen to produce springs of unvarying precision and accuracy. Feel free to check on any phase of spring design, on any type spring—compression, extension, torsion, or flat—hot or cold formed.

MUEHLHAUSEN SPRING CORPORATION
 817 Michigan Ave., Logansport, Indiana



**FREE! SEND FOR
 INFORMATION**

- New Die Spring Bulletin illustrates, describes 200 sizes and types of die springs.
- New Armament Bulletin shows importance of springs for many types of war equipment.



This Industrial Week . . .

FOR another seven days U. S. industry has been undertaking to prove that the world's highest priority rating on mass production of war implements is held in this country. In quantity of production of more and more vital war items, U. S. metalworking plants are first.

However great the job of winning the production phase of the second world war, U. S. industry has enough energy left over to fall savagely on its own members, on government war agencies and on the most battered of all targets—the priority system itself. Whether the aircraft industry is doing a better job than the automotive industry in getting out planes, engines and parts or whether the Detroit plants are doing the better job is one point of controversy. Whether the fabricators of war implements will have too much steel or not enough is another war argument that does not die.

Output May Be Embarrassing

To the average American, in or out of industry, such flesh tearing seems all to the good since it frequently speeds production.

More light on the rate of war goods production was shed this week at the American Iron & Steel Institute annual meeting at New York when Walter S. Tower, its president, declared that:

"Production of war materials is generally known to be approaching almost unbelievable volume. In fact, except for ships, so much may presently be coming off the various production lines as to be embarrassing, unless some better ways of disposal are found than now are in sight," Added Mr. Tower: "This war can be fought and won with the steel which you can now

make, if it is wisely apportioned according to actual need."

For hundreds of small metal product plants which found themselves temporarily or perhaps permanently knocked out of business by the recent War Production Board order forbidding the use of steel and other metals in hundreds of metal products, the Institute president's speech contained salt which sharpened the sting of their wounds. "I doubt if any of you ever expected to see the day when positive prohibition, supposedly in the interest of conserving supply, would deny the use of steel to such a range of items as asparagus tongs and attic fans; fly traps and hair curlers; pet beds and sitz baths; swivel chairs and tea pots. In fact, I doubt whether any of you would think of such articles as taking any real quantity of steel."

Priority Collapse Is Doubted

Then Mr. Tower said—and here is the part that small metal product plants heard or read with anguish: "If the present elaborate system of priorities were operating effectively, an order relating to such items and about 400 others like them (M-126) would not be necessary. If the system is not effective no such order offers any adequate remedy."

From all sides the present priority system is taking heavy blows but rumors of its collapse are lightly held by those who have closely watched developments of this system of controlling distribution of material and equipment. Many war agency officials them-

selves would give the priorities system of getting the right stuff to the right plants at the right time more than a barely passing grade. Since last summer the magic word "allocation" has been used by insiders and outsiders as a description of a system to come which would iron out all the evils of priorities.

Adams Against Overall Allocation

This week C. E. Adams, retiring head of the WPB Iron and Steel Branch, declared that the adoption of an overall allocation plan for iron and steel products would not work because (a) these products are made in thousands of shapes, sizes and specifications on hundreds of mills, and administering of allocations would necessarily drain a very large number of experts from the steel industry and (b) such a detailed and complex plan would necessitate expert and constant advice as to the relative urgency of various projects, products and orders, thus requiring some system of ratings, which would be a return to the priority system.

The latest development in efforts to improve the sequence in the flow of vital materials to war plants is the allocation classification plan. To measure accurately the use of metals and their products so that it can, as a matter of policy, control their distribution; the WPB soon is to announce this allocation classification plan, so that the exact flow of metals can be directed according to military demands.

Under this new plan, metal working industries will be asked to classify their requirements on a

Steel Ingot Production—Per Cent of Capacity

(Open Hearth, Bessemer and Electric Ingots)

	Pitts-	Chi-	Youngs-	Phila-	Cleve-	Buf-	Wheel-	De-	S.Ohio	St.	East	Aggrc-
	burgh	cago	town	delphia	land	falo	ing	troit	River	West	Louis	gate
Week of May 26...	98.0	107.0	100.0	75.0	97.0	104.5	83.0	98.0	101.5	105.0	97.0	97.0
Week of May 19...	98.0	104.0	100.5	92.0	95.0	104.5	83.0	98.5	105.5	101.0	111.0	99.0

quantity basis. Unless purchase orders bear appropriate classification symbols, no metal will be allocated once this is effective. The allocations classification system, which is expected to be applied to the iron and steel, as well as metal-working industries within a short time, will displace some and standardize others of the various forms for allocation purposes now submitted by industry.

When the allocation classification plan is put into use in conjunction with the production requirements plan, THE IRON AGE is told, 90 per cent of industry will no longer operate under the "P" or preference rating orders. WPB several months ago indicated that the expanding war program made it impossible to continue the use of preference ratings assigned under the "P" orders without any exact check of the amount of material obtained by their use. The allocation classification, according to one WPB priorities expert, will help stem priorities inflation.

Auto Firms Rush to War

Regardless of confusion over the priorities system, the plans proposed to succeed or alter it, the automobile industry has already adapted more than two-thirds of its automotive manufacturing equipment to the production of armament. In addition, 3 per cent of its equipment is earmarked for near-future war work, according to the Automotive Council for War Production. Available for transfer to other manufacturers is 13 per cent and on the waiting list for war work is another 9 per cent. Less than 9 per cent of equipment classified by the council remains at work, under government authorization, on production of automotive replacement parts.

GM Deliveries Up Sharply

Deliveries of war materials by General Motors in April (U. S. and Canada) rose \$17 million to a total of \$112 million while deliveries by this company in the first quarter were \$257 million, compared with fourth quarter delivery last year of \$158 million. The list of new war implement production includes manufacture of 30-ton medium tanks at Ford Rouge plant.

Meanwhile the torpedoing of

merchant ships in the Atlantic is being echoed in mill schedules by an increase in orders from East Coast yards for shapes and plates for repair work. With the plate picture approaching equilibrium at least as far as maritime needs are concerned, the War Production Board is now concentrating on cleaning up the structural shape situation. Allocation for shapes for ships in June is the largest yet assigned to some producers. In the Chicago area mills

New Priorities Guide To Be Ready June 4

• • • The sixth edition of the Priorities Guide, issued at intervals by THE IRON AGE for the use of industrial and government offices dealing with wartime controls of materials and machinery, will be published next week.

The June issue of the Guide, prepared by THE IRON AGE staff, will include listing of all metal industry priority regulations and forms, information on extensions and appeals, a directory of war agencies and other information needed by industry in wartime.

Prices for additional copies of the Guide are: one to 10 copies, 50c. each; 11 to 100 copies, 40c. each; 101 to 300 copies, 35c. each, and 300 or more copies, 30c. each. Wire or mail your order to THE IRON AGE, 100 East 42nd Street, New York. Kindly send stamps or coin with orders amounting to \$2 or less.

are losing substantial rail tonnages to make way for shapes.

WPB is putting on pressure for greater use of National Emergency steels and has authorized alloy steel producers to make up all NE heats in order to make billet stock available. Ordering of NE steels, on which a series of test results have been compiled, is increasing but not at the rate desired by WPB. Drastic steps by the government to increase the use of NE steels, intended to save nickel and other alloying metals, are now forecast.

Steel ingot production has dropped two points to 97 per cent of capacity, the decline, which may be wiped out before the week

ends, being entirely due to the shutdown of a Bethlehem Steel Corp. plant because of high water. If this plant, in which the affected steel making departments are getting back into operation more quickly than anticipated, had operated normally through the week, the national production of steel would have reached the all-time high of 100 per cent of the week of April 28.

Steel production in the Chicago area showed the sharpest increase of the week by gaining 3 points to a new high of 107 per cent. One large producer in that district expects this week to reach a new high level of 110 per cent for its plants.

Steel making districts reporting stronger mill schedules are Chicago, up 3 points to 107 per cent; Cleveland, 2 points to 97 per cent, and Southern Ohio, up 4 points to 105 per cent. Pittsburgh remains unchanged at 98 per cent, as does Buffalo at 104.5 per cent, Wheeling at 83 per cent, the Western area at 97 per cent, and St. Louis at 111 per cent. Districts reporting losses include Youngstown, down a half point to 100 per cent, Philadelphia, down 17 points to 75 per cent; the South, down a half point to 98 per cent, Detroit, off 4 points to 101.5 per cent and the Eastern area, down 4 points to 103 per cent.

Scrap Situation Causes Worry

Despite the improved scrap situation, steel makers are now beginning to worry about building stockpiles for next winter. So far only trifling amounts have been accumulated. On Saturday WPB issued an amendment to order M-24 removing inventory restrictions of Priorities Regulation No. 1 on iron and steel scrap to encourage the building of scrap inventories. Mr. Adams, of the WPB has just issued a warning on scrap collection. "Now that scrap is flowing more freely," he said, "there will be a natural tendency on the part of steel makers to let up on purchases in excess of demands. If this is done, there will be a natural slackening of scrap collection along the line. The mill which does not enter next winter with a substantial inventory is bound to run into difficulties."



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FROM AN ORIGINAL DRAWING BY ORISON MACPHERSON

SKILLED CREWS SET A FIGHTING PACE PRODUCING WAR STEELS

Like the Navy in action, crews of skilled men are setting a fighting pace in the production of fighting steels. Broadships that flare against the sky, night and day, tell that here in the steel works a battle is being waged and won — for it is on the home front that tools for victory must first be forged. These men of steel know their first-line duty is working on the important job of making steel — the job that years of experience and skill fit them to do. In all divisions, all departments, men and management also know that the more steel produced and delivered now — every hour of every day — the earlier the enemy will be defeated. So they do their fighting by producing steel for planes, tanks, guns, ships and shells at a pace that breaks all records and breaks them again and again.



Thousands of J&L
employees are buying
War Bonds on
voluntary allotment plan.
In many divisions
subscriptions have reached
100%.

JONES & LAUGHLIN STEEL CORPORATION

AMERICAN IRON & STEEL WORKS • PITTSBURGH, PENNSYLVANIA

PARTNER TO INDUSTRY IN WAR PRODUCTION

**J&L
STEEL**

News of Industry . . .

Output May Exceed War Plants, Needs, Tower Tells Institute

• • • Analysis of some of the major changes which the steel industry is undergoing in its current period of unprecedented production provided the keynote at the 51st general meeting of the American Iron & Steel Institute, at the Waldorf-Astoria in New York on May 21.

Walter S. Tower, Institute president, taking a speculative look at the future, asserted the nation's basic industry will continue to be steel despite all new competitive elements, for it alone can be made in quantity and at a suitably low price for the normal national economy. At one of the round table sessions, H. J. French, senior technical consultant of the metallurgical and specifications section of the WPB iron and steel branch, pointed out that profound changes are

being made in many of the habits of the industry, reflected in the availability and use of many of the industry's raw materials.

At the same time tributes were paid to the production job which the industry has been doing and which has emphasized the vast superiority of the United States steel industry over the Axis. C. E. Adams, retiring chief of the WPB iron and steel branch, and principal speaker, revealed that in the week of May 16 the industry produced 220,000 tons of steel plates, an all-time world record, of which 94,000 tons came from strip mills. The industry is making nearly twice the tonnage of plates that all the rest of the world can roll, it was pointed out by Mr. Tower.

In fact, there are indications that ability to make steel for war

will be in excess of the ability to fabricate it, asserted the Institute president.

The necessity for maintaining the high level and for distributing steel for the war program wisely was brought out at the session. Mr. Tower brought out that "if and when the blast furnace program is finished, it is assumed there will be enough steelmaking iron available for 92 to 94 million tons of ingots, but according to present prospects those figures are not likely to be reached until the middle of 1944.

"Under the circumstances," he continued, "A steel expansion program, planned to add some 10 million tons of ingot capacity, has little chance of making any early contribution to steel supply for war uses. In fact, it already seems doubtful whether that program will be completed. The facts suggest, therefore, that the war effort over the balance of this year and well into 1943 will have little, if any, more than the current volume of steel output. This war can be fought and won with the steel

STEEL MEN MEET: Abandoning formalities and fanfare, the American Iron & Steel Institute held a one-day conference for the 51st annual meeting. The photo at left shows Ian F. L. Elliot, member of the British Iron & Steel Institute, awarding E. G. Grace, president of Bethlehem Steel Co., the Bessemer Medal and the accompanying scroll. At right, the board of directors of the American Iron & Steel Institute is shown.



which you now make if it is wisely apportioned according to actual need. Indeed, there are some in the industry who question whether all the available steel will be used, unless some of the present limitations on consumption are relaxed."

The 800 Institute members attending the general session in the grand ball room of the Waldorf witnessed the presentation of two

medals—the American Iron & Steel Institute Medal to H. W. Johnson, assistant general superintendent of Inland Steel Co.; and the Bessemer gold medal diploma of award from the British Iron & Steel Institute to E. G. Grace, president of Bethlehem Steel Co. In addition, Mr. Tower was presented with a diploma of honorary membership in the British Institute.

Ian F. L. Elliott, who is departing soon after being in this country for several years coordinating British steel purchases, presented the medal to Mr. Grace "in recognition of his outstanding achievements in the world of steel but also of the sure and powerful support which the steel industry of America has given to the British industry in its time of need."

Mr. Grace in accepting the award said he believed the honor rightfully was shared by the entire United States steel industry and by his own associates, as much as by himself.

"Good as our performance has been, it is not enough to win the victory," said Mr. Grace. "We must quicken our pace. At all times, the various companies in the American steel industry must unselfishly and wholeheartedly serve our government and our Allies without regard to competitive rivalries or to anything but the job of maximum production to win the war as soon as possible."

All officers of the Institute were reelected at the 51st general meeting. J. H. Parker, president of Carpenter Steel Co., was elected a director of the Institute.

Mr. Adams who was scheduled to turn his WPB job as chief of the iron and steel branch over to Reese Taylor on Monday of this week, outlined the organization of the branch and told why he believed the setup could be made to work. One difficulty has been, he said, that the committee must necessarily consider one product in an emergency at a time, whereas many steel products particularly must be considered in correlation. To overcome this difficulty, a sub-committee on steel requirements is being set up.

Concerning the advisability of allocation of all steel products, Mr. Adams asserted that such a move would be "unwise and impractical" for the following reasons:

"1. These products are made in thousands of shapes, sizes, and specifications on hundreds of mills, most of which have differing size and quality ranges. Therefore, the intelligent and effective administration of such a program would need a very large and experienced staff, many times the size of the present force. Such personnel could be secured only from the steel industry, because it is impossible to train inexperienced men

NEW SHIPPING HEADS: Recently appointed Lewis W. Douglas (left), Deputy Administrator, and Rear Admiral Howard L. Vickery (center), Deputy Administrator, met with Rear Admiral Emory S. Land (right), War Shipping Administrator, for their first shipping conference in Washington on May 20.

AP Photo



CAPT. WHELESS AT NATIONAL TUBE: Captain Hewitt T. Wheless, a hero of the South Pacific who was commended for his fine work by the President in a speech, visited the bomb spinning department of the National Tube Co.



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FOR DEPENDABLE

PERFORMANCE IN

TOOL STEELS



These blanking dies are an example of the successful use of Coppco Tool Steels. They are made from "Coppco 200"—black label—an oil-hardening steel. We welcome inquiries on your tool steel requirements.

COPPERWELD STEEL COMPANY WARREN, OHIO

"COPPCO .75"

Hardens to give greater toughness than Coppco Universal or Coppco 1.10

"COPPCO UNIVERSAL"

Balanced hardness and toughness
Good cold cutting properties



"COPPCO 1.10"

Gives maximum hardness
Holds a keen cutting edge
Resists wear

"COPPCO 200"

Non-deforming · Deep-hardening
Wear resistant

WATER HARDENING
OIL HARDENING

for this work within any reasonable period of time. The industry is already suffering from the conscription of its manpower, and such a wholesale drain of experienced personnel could result only in decreased production, inefficiency and other difficulties, which would defeat the very purpose of the program.

"2. Such a detailed and complex allocation would, of course, necessitate expert and constant advice

as to the relative urgency of the various projects, products, and orders. In order to avoid delays, some system of ratings would be essential. This would, of necessity, be a return to the priority system, with resultant pyramiding of organization and personnel."

Mr. Adams said, "when an allocation or priorities system is used, it is still necessary to rate first things first. A great fault with the present system is that ratings have

been issued on the basis of the delivery desired rather than on the basis of the importance of the end product and the end use. This fault in the administration of the priorities system does not, I feel, constitute an insurmountable difficulty, nor is it a sufficient reason for attempting a change to complete allocations.

"I said I would give reasons as to why I felt that the organization as just described could be made to work, with of course such changes from time to time as experience dictates. I will give one reason. It has met with that full measure of cooperation from the industry which is so absolutely essential to our whole war effort."

Mr. Tower, touching upon priorities control and a wide range of other problems, brought out that few can doubt that "government control of this industry is now practically complete."

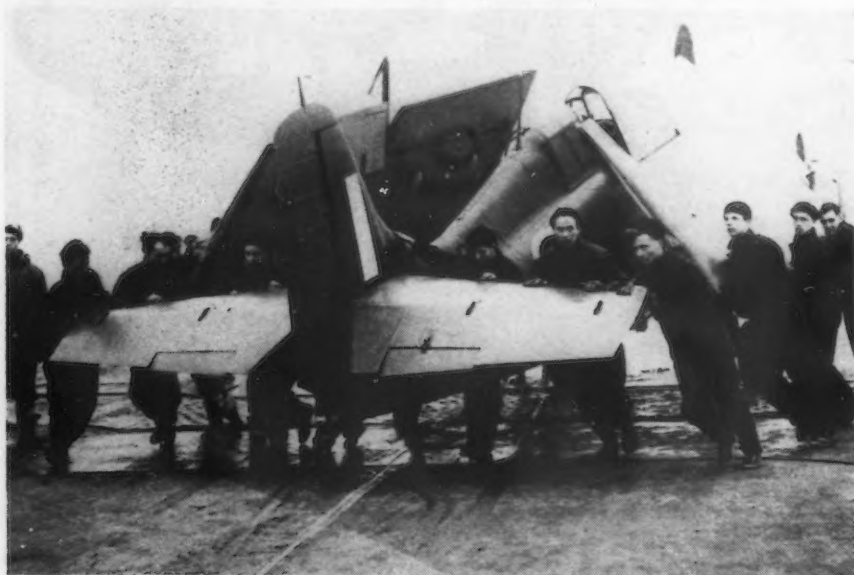
"I doubt if any of you ever expected to see the day when positive prohibition, supposedly in the interest of conserving supply, would deny the use of steel to such a range of items as asparagus tongs and attic fans; beer mugs, butter chips, etc.," he said. "In fact, I doubt whether any of you would think of such articles as taking any real quantity of steel."

"If the present elaborate system of priorities were operating effectively, an order relating to such items and about four hundred others like them (M-126) would not be necessary. If the system is not effective no such order offers any adequate remedy."

"As the steel industry now stands, it faces four pressing problems. How to satisfy its clamorous critics. How to reconcile exacting demands to limitations imposed by critical materials. How to resist forces which contribute to inflation. How to preserve an industry where men may be free to work."

"Those critics who insist that they must have more steel overlook some of the plain facts of the matter."

"The industry began this year with a rated capacity of approximately 88½ million tons. Production to the end of April, just above 28,000,000 tons, was still short of matching that capacity, in spite of all efforts to squeeze out every last ton. As many in the industry know from actual experience, it is possible, over sustained



British Combine Photo

BACK IN ACTION: First photos to be taken of the aircraft carrier, *H. M. S. Illustrious*, since the ship was re-commissioned after refitting in American and British repair yards, show her ready for duty. This ship suffered extensive damages when subjected to mass dive-bombing attacks in the Mediterranean. Above shows American built "Martlet" airplane, with wings folded back, being run onto the lift, while below are shown baby tractors (an American innovation) used for arranging the airplanes on the flight deck.



periods of time, for steel furnaces to exceed rated capacity by a margin of 2 or 3 per cent. But until larger supplies of metallics, iron ore and scrap, can be had, it is doubtful whether recourse to all possibilities will suffice to keep steel tonnage up to the rate prevailing so far this year, or a total of 85,000,000 tons for all of 1942.

"As and when the country comes out of this war victorious, the number and the magnitude of the problems which will have to be faced are perhaps beyond present accurate measurement or comprehension. We still do not know whether in winning this war we may not lose those liberties for which we believe the war is being fought.

"For your own industry, however, there are certain aspects of the future which can be thought of in concrete terms.

"With frozen costs and inflated taxes, a decline in prices or in volume of production when the war ends could quickly bring acute trouble to steelmakers.

"We know pretty well what the capacities and the facilities of the industry are likely to be at the end of this year, at the end of next year, and on to the end of 1944. Those are already well laid down in an orderly program of growth and dictated expansion. In a space of three or four years the industry will have anticipated all the expansion and evolution that normally could have been expected in a generation."

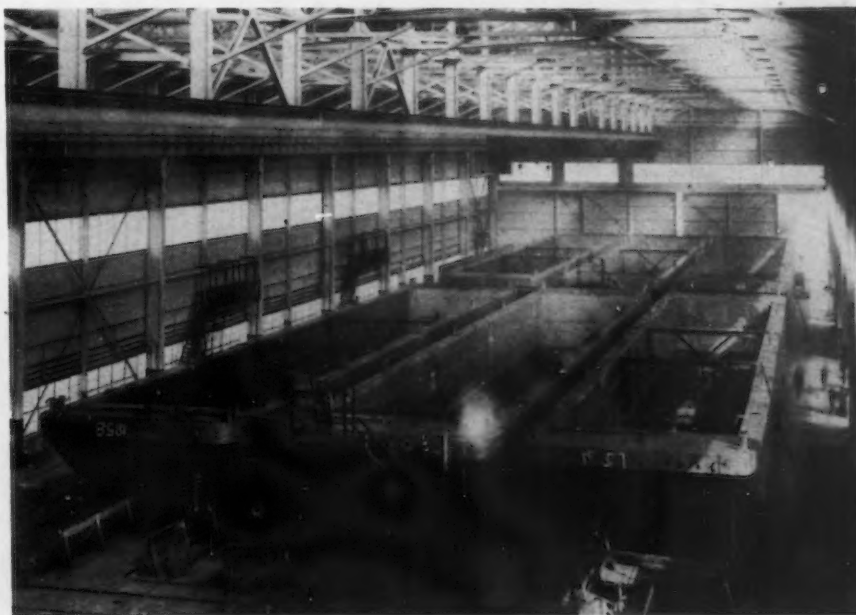
New Inland Mine to be Dedicated on May 29

••• A new iron ore operation, one of the largest to be started since war was declared, will be opened officially at Iron River, Mich., on Friday, May 29, Inland Steel Co. announced after being informed that ore had been struck at the 400-foot level.

Known as the Sherwood mine, Inland's new source of raw materials for its blast furnaces at Indiana Harbor is the fifth producing property in the Lake Superior region of which Inland is sole operator. It is located a mile and a half north of Iron River, Mich., in the Menominee range. Fee owners, Inland mine officials, and executives from the Chicago offices will take part in the dedication.



HANG THE RATS: Accidents, Lost Time, and Inefficiency, in the persons of Hitler, the big Muss, and Hirohito, recently were hanged after being convicted of impeding production, at the Meriden, Conn., plant of New Departure Mfg. Co.



4 BARGES A WEEK: For the past 13 weeks, American Bridge Co. launched 4 barges a week. Completed in record time was an order for 60 all-welded coal barges of 1000 net ton capacity. Each was 175 ft. long, 26 ft. wide, and 11 ft. deep, and the whole job required 9120 tons of fabricated steel.

293 Ore Boats In Service On Lakes

Cleveland

• • • The latest statistical analysis of the position of the American Great Lakes ore vessels as of May 15, 1942, indicates that thus far 293 boats are in commission and five more are undergoing refitting to be in service in the near future. According to C. C. Lindeman, statistician for the M. A. Hanna Co., the 1942 U. S. ore fleet when 100 per cent in commission will have a trip capacity of 2,724,540 gross tons of iron ore as compared with the trip capacity of 2,688,040 gross tons of ore for the 292 ships in commission a year earlier.

On a 32-trip basis the fleet would be able to bring down 86,126,080 gross tons of ore, and this would not include the increased participation in the movement expected from Canadian vessels. Moreover, the extension of the summer draft depth into the spring and fall shipping season

will permit the carriage of a substantial additional tonnage this year, while the efforts of the Office of Defense Transportation in applying priorities to iron ore movement should easily permit the movement of the 90,000,000 gross ton objective for this season, by the diversion of coal, limestone and grain shipments on the Great Lakes.

Harnischfeger Again Doubles Welding Unit Production

Milwaukee

• • • Harnischfeger Corp. has again doubled the production rate of its P&H Hansen square frame welding units. This expansion in output, the corporation reports, was necessary to meet the heavy demand of the war program. Demand from fabricators is said to be particularly active. This welding machine is arranged so that two or more units may be hooked up in parallel when the current demand exceeds the capacity of a single unit.

Cleveland Twist Drill Force 4 Times Normal

Cleveland

• • • Since the start of the present world war in late 1939, the Cleveland Twist Drill Co. has increased its working force by more than four times over its normal staff. With present employees totaling 2600 men and women, the company has been able to register a 600 per cent increase in production from its pre-war rate. Besides being due to increased personnel, the production gain is also attributed to an actual rise in per man output, and the installation of additional equipment. At present the company reports a six-months' backlog on some items, despite a 96-hr. week. Operations now are on the basis of two 12-hr. shifts during two days of the week and two 8-hr. shifts on four days, with one 8-hr. shift on Sunday.

The company has under construction a 200 x 60 ft. building for storing production materials, particularly steel. Upon completion this building will permit the company to shift to it heavy stocks of steel which are now occupying valuable plant space. This transferral is likely to result in the installation of new machine tools and other production equipment in the plant space to be vacated by present stocks. The company reports that production has not been delayed by any material deliveries. Although it normally sells to mill supply houses, company officials believe that actual consumption of its cutting tools by war plants may total as high as 99 per cent of its entire output. This estimate is backed up by the fact that the company was awarded the Navy "E" and the new Army "A" on Friday, May 22.

STEEL WORKERS MEET: More than 1700 delegates, representing 600,000 members of the CIO United Steel Workers of America (new name for Steel Workers Organizing Committee) attended the union's constitutional convention at Cleveland. This is the first major labor gathering since Pearl Harbor.

Wide World Photo

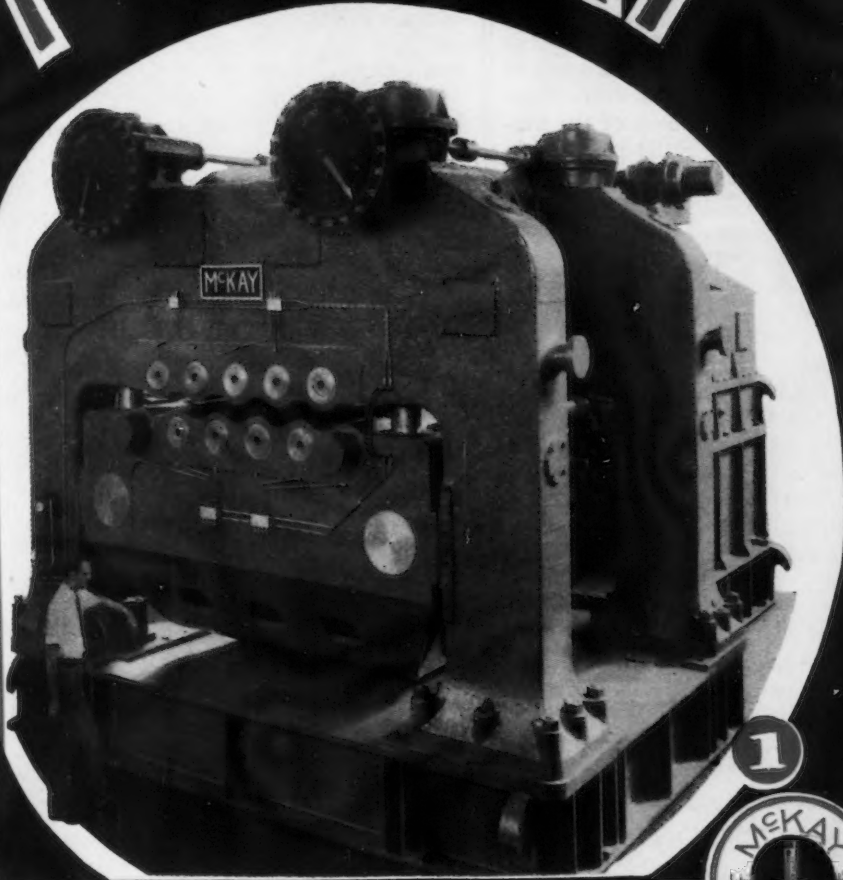


Whiting Corp. Expands Plant

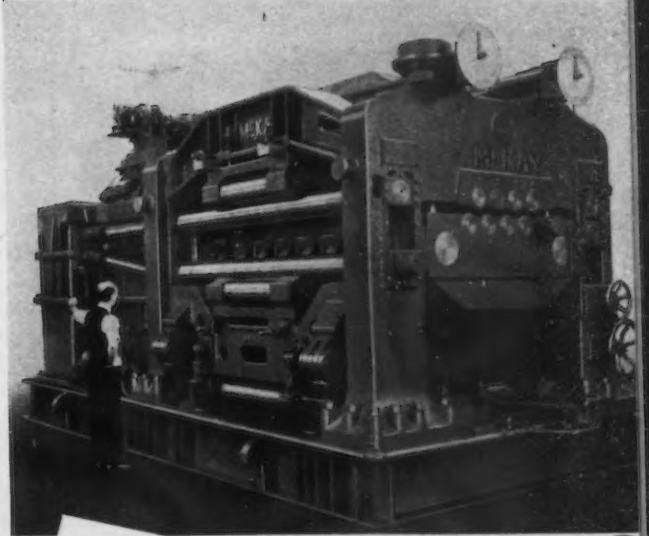
• • • Howard D. Grant, executive vice-president of Whiting Corp., has announced approval by the government of a building program which will add approximately 55,000 sq. ft. of manufacturing space to the company's facilities at Harvey, Ill. The plant additions will cost an estimated \$325,000, not including the required tools. Production for the twelve months ended April 30 was 60 per cent greater than the preceding year's.

McKAY

1. The McKay Heavy Duty Roller Leveller.
2. The Budd-McKay Processing Machine.
3. McKay Heavy Duty Backed-up 4-Hi Plate Leveller.
4. Backed-up Roller Leveller



1



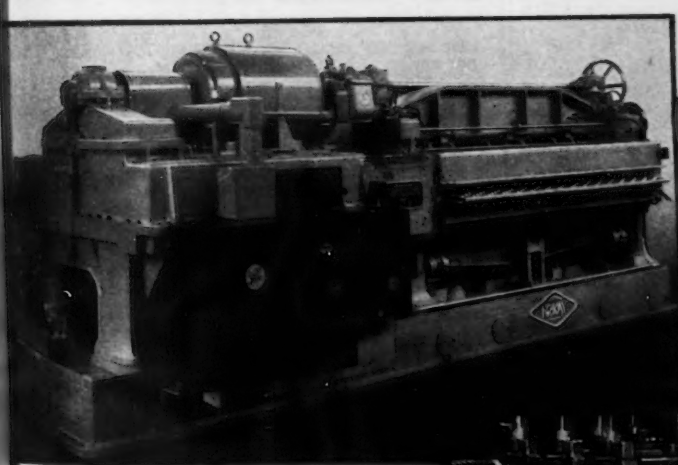
3



4



2



5. McKay Electric Tube Welder.

5



McKAY MACHINE *Company*
 BUILDERS AND MANUFACTURERS OF SHEET, TIN, AND STRIP MILL EQUIPMENT
 YOUNGSTOWN, OHIO
 ASSOCIATED COMPANY
 The WEAN ENGINEERING CO., Inc. • WARREN, OHIO

Why Are Black Bolts Black?

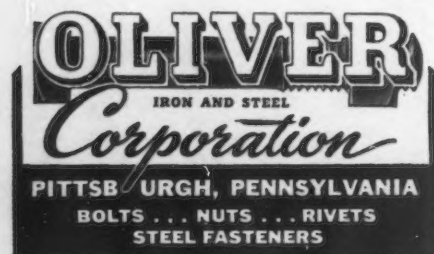
■ Coincidental is the fact that black bolts . . . the common garden variety bolt used on all sides of you . . . are made from green rods. The truth is green rods are not actually green and black bolts are not naturally black . . . they are black for a purpose and this black finish means a great deal to you and to industry.



Common bolts are common only because they are mass-produced . . . this brings needed economy to permit their extensive use in thousands of applications . . . and the black finish completes the economy picture by providing the cheapest possible protection against ordinary rust and corrosion before and while the bolt is in use.

To form this black, baked-on oil coat, the bolts, following heat treatment, are quenched in a special oily compound at a carefully controlled temperature. As the sizzling bolt strikes the quenching compound, a tough, water-repellent finish of baked-on black oil is formed on all surfaces, giving Oliver Bolts their characteristic black color and serviceability . . . ever-ready ability to withstand atmospheric conditions.

The black finishing of Oliver Bolts was as carefully developed and is as accurately controlled as the precision forming, threading and heat treating operations that have long earned recognition and acceptance for Oliver Bolts, Nuts and Steel Fasteners. Whatever your fastening uses may be for the duration . . . the complete, experienced and proved facilities of Oliver Iron and Steel Corporation provide a thorough and economic steel fastener service for all War Program and essential applications.



NEWS OF INDUSTRY

Machining of Metals Subject Of British Bibliography

• • • The Central Library of Sheffield, England, has just published Research Bulletin No. 6, dated May, 1942, containing an extensive bibliography of books and periodical articles dating back to 1935, covering various phases of the machining of metals. Fully two-thirds of the references have been obtained from American publications, including THE IRON AGE. The subject matter is divided into a number of parts beginning with principles of cutting, materials used for cutting tools, carbon and alloy tool steels, heat treatment of tool steels, high speed steel, cemented carbides, machineability and machining operations, followed by articles and books relating to specific machining operations such as lathe, planer, boring, milling, broaching and grinding work.

Copies of the bulletin may be obtained by writing on company letterhead to the Administrative Dept., Central Library, Sheffield, 1, England, inclosing threepence (6c.) to cover the cost of postage.

International Machine Tool Shipments 128% Over 1941's

• • • International Machine Tool Corp. during the first six months of its fiscal year ended April 30, 1942, increased its shipments of machine tools to the builders of ships, tanks, airplanes and guns 128 per cent over the same period last year. C. Russell Feldmann, president of the company announced today. Since Nov. 1, 1941, the beginning of the company's new fiscal year, production steadily increased month by month and at the half year mark shipments of products exceeded by more than 50 per cent the 1942 production rate requested by the War Production Board, Mr. Feldmann said.

American Steel & Wire Plants Pile Up Production Records

Cleveland

• • • Plants of the American Steel & Wire Co., U. S. Steel subsidiary, broke 81 production records during April, making a total of 252 new high marks established in the first four months of 1942. Last year the company's plants set a total of 837 new production records.

20,000 Leagues under . . . Sold by the Pound

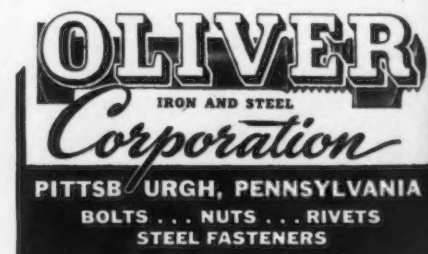
■ Jules Verne's veritable prediction of ships operating 20,000 leagues under the sea has proved very realistic and is becoming increasingly serious with submarine warfare serving all nations as a way of overcoming air superiority.

Down into the briny depths where blackout always holds forth go men and machines of destruction. Soon, too, may come undersea craft for freight . . . for military transport . . . for secret missions free from aerial attack. This will take tons of steel, huge motors, tremendous fuel tanks,



batteries, gages, valves, cables, wiring and hundreds of other materials. As crucial as any material required . . . bolts, nuts and rivets . . . tons of them . . . must lock the seams, batten the bulkheads, seal the compartments . . . even fasten the valves. Every one must be absolutely dependable to do the job it was intended to do and in addition take the *extra shock-load* when it occurs. Strange as it seems, these vital links of construction . . . these bolts, nuts and rivets . . . are made by the million . . . sold cheaply by the pound . . . and yet answer every specification.

Important to submarine and ship construction . . . to hundreds of other uses in armament and to thousands of uses in industry are Oliver Steel Fastenings. You may be operating under direct contract or sub-contract . . . perhaps you are manufacturing your regular products . . . at all events you are working under pressure—therefore, look to Oliver Iron and Steel for dependable fastening counsel and complete cooperation.



NEWS OF INDUSTRY



INS Photo

GAS RAID PRACTICE: Here, at a Canadian naval shore station, a decontaminator, all rigged out in the "latest style" for gas raids, is rescuing a buddy who is similarly garbed.

New Plant, Air Force Schools And Cantonment Scheduled

•••The War Department announced May 20:

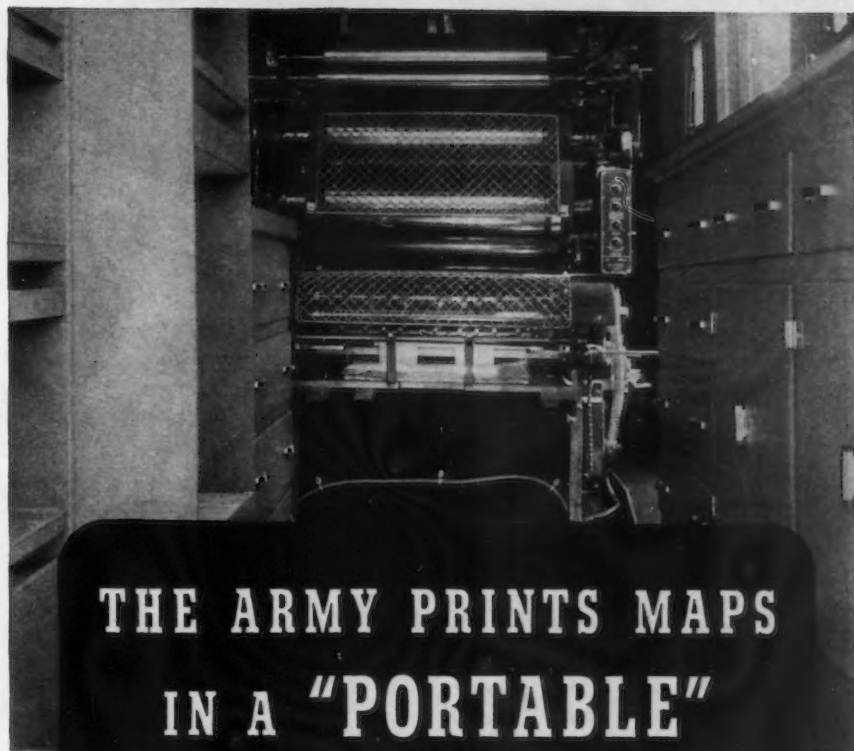
1. Authorization for the acquisition of the Battle Creek Sanitarium, Battle Creek, Mich., for a general hospital. It is estimated that in excess of \$3,000,000 will be expended. Construction in connection with this project will be supervised by the Chicago district office of the Corps of Engineers.
2. Award of a contract to the General Motors Corp., Detroit, for construction-management in connection with a manufacturing plant in Ohio, to cost in excess of \$3,000,000. Construction will be supervised by the Detroit district office of the Corps of Engineers.
3. Authorization for the construction of an air force training school at Marfa, Texas, to cost less than \$3,000,000. Construction will be supervised by the Albuquerque district office of the Corps of Engineers.
4. Authorization for the construction of a cantonment at Gainesville, Texas, to cost in excess of \$3,000,000. Construction will be supervised by the Denison, Texas, district office of the Corps of Engineers.
5. Authorization for the construction of an air force training school at Dalhart, Texas, to cost in excess of \$3,000,000. Construction will be supervised by the Tulsa district office of the Corps of Engineers.

Aircraft Meeting Photo

•••The photograph of A. J. Fisher, Charles A. Lindbergh, and Clarence W. Avery at the SAE meeting in Detroit, shown in THE IRON AGE, May 21, page 120, was made available through the courtesy of the Detroit Free Press.



COURTESY FRUEHAUF TRAILER COMPANY



An order comes through—maps are needed now! There's no time to wait while a printing press goes into action miles away. So the Army "rolls its own" right up to the battlefronts.

The photos show a press car ready for service with the field forces. Inside is a complete printing set-up. Outside, ARMCO PAINTGRIP sheets cover the top and other parts of this print shop on wheels.

ARMCO PAINTGRIP is used because this special zinc-coated metal takes and preserves paint. Since any color combination may be used, ARMCO PAINTGRIP can be camouflaged effectively. Paint goes on fast, because no pre-treatment is needed. The bonderized film insulates paint from the zinc, greatly retarding peeling and flaking.

Would this paint gripping metal do a better job in your war products? If you would like fabricating information about ARMCO PAINTGRIP write The American Rolling Mill Co., 1581 Curtis St., Middletown, O.

TO KEY MEN: Can You Use Sheet Metal Working Data for War Products—and Post-War Plans?



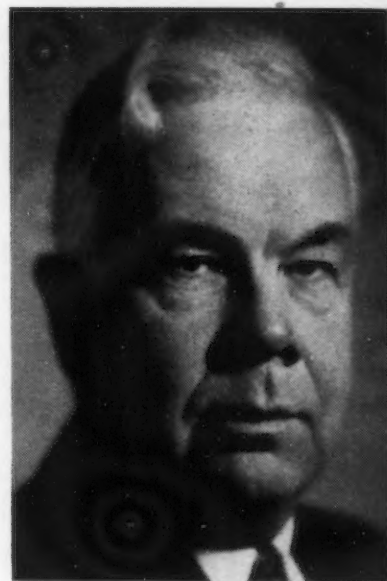
Henry Prentiss & Co. Withdraws from Business

New York

• • • "To the end of withdrawing from the sale of machine tools, Henry Prentiss & Co., New York, will cease to accept orders upon the conclusion of business, May 31." Although the amount of business on the books precludes the immediate withdrawal from business, in effect this announcement of the company marks the end of

the oldest and best known machine tool dealer organization in the country.

Henry Prentiss founded the business that bears his name 67 years ago, in 1875, under the name of H. Prentiss & Co. He has not been actively connected with the firm for the past 20 years, but is still hale and hearty in his 95th year. In the early years the company was a mill supply house, selling such items as Goddard's patent taps, dies, reamers and screw-



W. F. McCarthy

Who will retire from Henry Prentiss & Co.

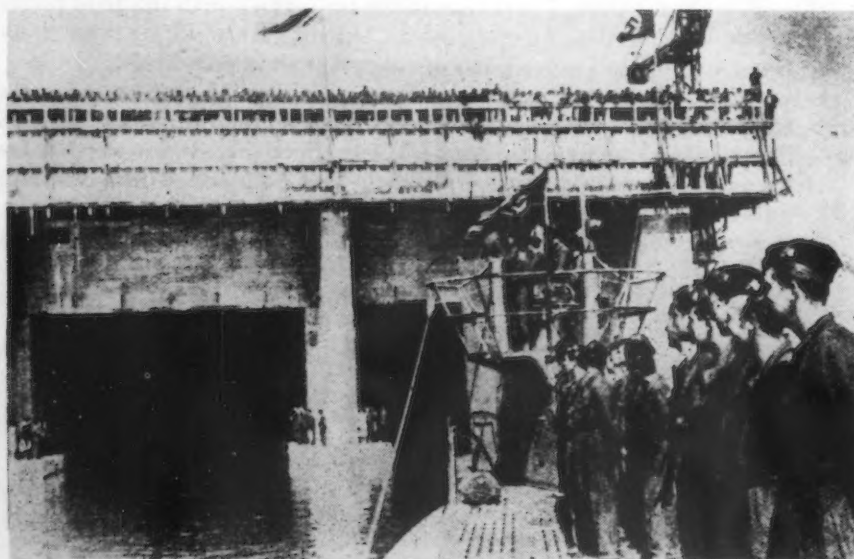
TANK WRECK IN U. S.: These nine tanks were not permanently stopped by anything like a train wreck (somewhere in Illinois), but will soon take the field against the enemy. Here, the huge tanks are shown flung helter-skelter when the flat cars of a freight train were derailed.

INS Photo



SUB NEST: This German photo shows a U-boat being towed into one of the steel and concrete "bomb-proof" docks somewhere along the west coast of France. The Germans class the sub nest as a "novel naval strong point."

INS Photo



plates; drop forgings made by Billings & Spencer Co., anchors and hardware items.

Ten years later the concern was incorporated under the name of Prentiss Tool & Supply Co. The first machine tool account was taken on in 1883 when the firm became sales agent for Henry Bickford who was then making drill presses in Cincinnati. That was four years before the Bickford Drill Co. was organized, later to be known as the Cincinnati Bickford Tool Co. At that time all the established Eastern machine tool builders were selling direct, and Mr. Bickford sought a sales agent in New York because of the distance from his works.

In 1887 the line of the Cincinnati Screw & Tap Co. was taken on. This company was reorganized by Frederick A. Geier as the Cincinnati Milling Machine Co. in 1889. The Prentiss company has acted as dealer for both the Bickford firm and the "Milling Machine" company up until the time of its dissolution.

Because there were no other dealers in the field, the firm assumed the aspects of a national sales organization for machine tool builders, who in those days were primarily good mechanics rather than good salesmen. At one time the company had offices not only in New York State and in New England, but also in Chicago and Cleveland, all directed from the New York office. In 1892, how-



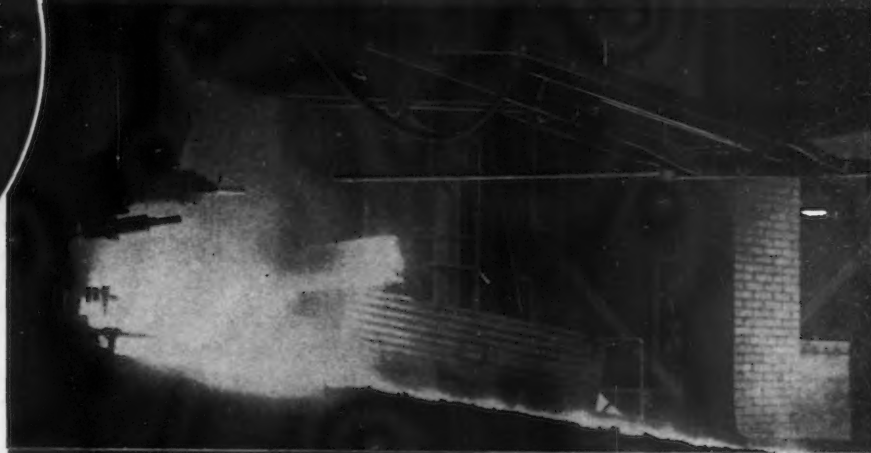
DEFENSE HELPERS
that

Speed **IRON PRODUCTION**

Two proved allies of iron production . . . the Bailey Electric Plunger Clay Gun for Tap Hole stopping and the Bailey Cinder Notch Stopper! Both are examples of mechanical perfection . . . both do their jobs completely and surely year after year without maintenance.

The electric plunger principle . . . which is a

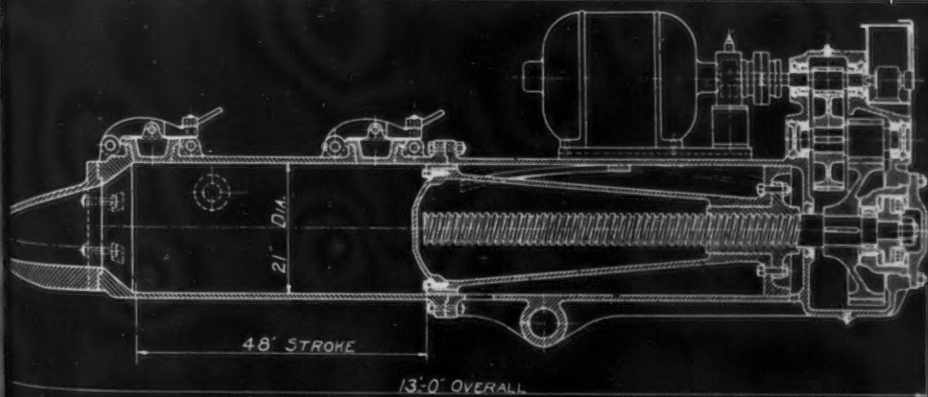
BAILEY ELECTRIC PLUNGER CLAY GUN



BAILEY CINDER NOTCH STOPPER

power driven, screw action mud cylinder, never fails . . . forces mud into the hole at terrific pressure. Every movement of the gun is direct power driven . . . faultlessly accurate and positive.

To cut tapping time and speed blast furnace production, switch now to Bailey Clay Guns and Cinder Notch Stoppers . . . the fast, dependable method.



WILLIAM M.
BAILEY COMPANY
ENGINEERS
PITTSBURGH, PENNSYLVANIA

ever, because of the difficulty of administrating affairs so distant from the main office, the business in both these Midwestern cities were sold to Marshall & Huschart Machinery Co., of Chicago. About 10 or 12 years later, Marshall-Huschart in turn sold its Cleveland business to Motch & Merryweather Machinery Co. Because of the origins of these dealer organizations, both of them have represented substantially the same machine tool builders as has Henry Prentiss & Co., Inc., up until now. The present name was the result of a re-incorporation in 1916.

For many years, the Prentiss company has represented the following firms:

Abrasive Machine Tool Co., East Providence.
Acme Machine Tool Co., Cincinnati.
Avey Drilling Machine Co., Cincinnati.
Blanchard Machine Co., Cambridge, Mass.
Bryant Chucking Grinder Co., Springfield, Vt.
Cincinnati Bickford Tool Co., Cincinnati.
Cincinnati Milling Machine & Cincinnati Grinders, Inc., Cincinnati.
Cincinnati Planer Co., Cincinnati.
Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.
Gould & Eberhardt, Irvington, N. J.
Hanchett Mfg. Co., Big Rapids, Mich.
Lodge & Shipley Machine Tool Co., Cincinnati.
Moline Tool Co., Moline, Ill.
National Automatic Tool Co., Richmond, Ind.
Racine Tool & Machine Co., Racine, Wis.
The V & O Press Co., Hudson, N. Y.
O. S. Walker Co., Worcester, Mass.

The headquarters office had

many addresses in New York City. From 14 Dey Street, it was moved to 115 Liberty Street, then to 149 Broadway, where it remained from 1911 to 1930, when the company deserted downtown New York for the Chrysler Building, its last address.

Since the retirement of his father 20 years ago, Marshall Prentiss has been president of the company and has administered it financially. William F. McCarthy, vice-president and general manager, has been in active charge of the selling organization for the past 15 years. Long considered the dean of machine tool dealers, Mr. McCarthy will retire after 42 years of service with the company. From 1901 to 1927, he was manager of the Boston office.

Failing health of these two leaders of the firm apparently was what motivated the company to take this step toward dissolution at a time when its unfilled orders were the highest in its history, representing about eight times a normal year's business. Because of this huge backlog, equivalent to much more than the total dollar volume of the entire machine tool industry in 1933, it will probably take well over a year to liquidate present orders on the

books. A reduced staff will be maintained for servicing this business.

Cincinnati Milling to Sell Direct in the East

••• The Cincinnati Milling Machine Co., manufacturers of milling, broaching and cutter sharpening machines, and Cincinnati Grinders, Inc., manufacturers of grinding and lapping machines, will on June 1 serve their customers in New York State and New England through their sales subsidiary, Cincinnati Milling and Grinding Machines, Inc., with district offices located in New York, Hartford, Boston, Buffalo and Syracuse. A staff of field engineers, service men and demonstrators, technically trained and thoroughly experienced in milling, broaching, cutter sharpening, grinding and lapping methods, will provide prompt and effective service to the manufacturing industries in these areas.

Weir Says Civilian Steel Needs Are Out for Duration

Pittsburgh

••• The steel industry can supply enough of its products to build needed war weapons and rubber plants, but civilian needs are out for the duration, Ernest T. Weir, board chairman, National Steel Corp. told correspondents on the National Association of Manufacturers' "production for victory" tour here last week. Mr. Weir said the steel industry is ready to go far ahead of its present production schedule, but is having difficulty obtaining structural steel requirements.

New 140-In. Mill Adds 50% To T.C.I.'s Plate Capacity

Birmingham

••• Another step in the completion of a large expansion program started in 1940 by the Tennessee Coal, Iron & Railroad Co., was taken May 26 when plates started rolling from a new 140-inch, four-high plate mill, which will add approximately 50 per cent to the company's present plate producing capacity. A new blast furnace and an additional battery of coke ovens had been previously completed and placed in service.

LATHE INTO BORING MILL: Reversing the usual lathe practice, several 10-in. toolroom lathes of the Monarch Machine Tool Co., Sidney, Ohio, are being used for high speed boring of numerous machine parts. Here, a rear lead screw bracket, previously cast solid, drilled, and reamed, is being finished, cored and bored accurately to final size.



All Metals to Go Under PRP Shortly

Washington

••• To measure accurately the use of metals and other products so that it can, as a matter of policy, control its distribution, WPB will shortly announce the "allocation classification" system, previously reported in *THE IRON AGE* (March 26, Page 80) as the "end use code." Through its use, the WPB will be able to know the exact flow of metals so that the flow can be directed according to military demands.

Metal working industries will be asked to classify their requirements on a quantity basis. Unless purchase orders bear appropriate classification symbols, no metal will be allocated once this is effective. The system is expected to be applied to the iron and steel, as well as other metal working industries within a short time.

The system will displace and standardize the number of differing forms for allocation purposes which industry must now submit. It will become a part of form PD-25-a, revised, the principal form under the Production Requirements Plan, under which quarterly material requirements with preference ratings are granted.

When the allocation classification is put into use in conjunction with PRP soon, 90 per cent of all industries will no longer operate under the "P" or preference rating orders. WPB said several months ago that the expanding war program made it impossible to continue the use of preference ratings assigned under the "P" orders without any exact check of the amount of material obtained by their use. The allocation classification, according to one WPB priorities man, will help stem priorities inflation, and at least partly plug the flood of material leakage.

The classification consists of 23 broad bands of use, decimally numbered. Classification numbers are to be placed on purchase orders by producers so that a convenient means is provided for identification of the subdivisions of the program for which the products or materials ordered are destined, and for simultaneously transmitting the identification on down through industry to the original suppliers

of the material. The 23 bands of use and their symbol or classification numbers will broadly cover all American industries.

Each business should first determine whether its operations fall directly into one or more of the allocation classifications. If they do not, a firm should use the classification symbols shown on customers' orders, and transmit these symbols to its suppliers. If a business falls directly into one of the allocation classifications, it should transmit these classification numbers on its orders.

To arrive at this conclusion, the company should consult the "specific instructions" covering its class for any special instructions that apply to that class alone.

Any business whose operations fall directly into two or more allocation classifications should place on its purchase orders the percentage division between the sales for the latest available month. For example, a company engaged in the manufacture of household and office furniture should place on its orders, "16.00—6 per cent; 19.00—4 per cent."

Where the product of a business does not fit any classification symbol. (For example: parts, subassemblies, such as electric motors, air compressors, ball bearings, etc.) the business should transmit

SPEED PRODUCTION, DROP A PLANE: A leading New England small arms maker uses this animated poster to boost production. The Jap plane, flying toward a city to bomb it, is shot at by the anti-aircraft gun. The path of the bullet from the gun to the plane is a day's output for the department, and this path is illuminated progressively as production mounts. When the schedule is complete and the bullet reaches the plane, the Jap plane explodes. This should happen three times a day, as the shop is on a 3-shift basis.



the classification symbol into which all items on the purchase order fall.

Where each item on the purchase order can be traced to two or more allocation classes, the business should place on the purchase order for that item the percentage division between allocation classes, based on the dollar volume of its sales using the latest available month as the base period.

The following principles should be followed in doing this: If the business falling under any one symbol comprises 5 per cent or more of the total business, it should be shown on the purchase order; if the business is less than 5 per cent of the total dollar volume and can be grouped with other classes falling under one main allocation classification, it should be combined and shown. For example, small percentages of separate caliber ammunition could be combined and shown as a total under the symbol 5.00.

After combining the subdivisions under any one main classification, if the dollar volume of the main classification is still less than 5 per cent, this portion of the business should be pro-rated over the classifications which are 5 per cent or more.

To obtain a materials picture of metal rationed by other agencies, WPB has designated the following letter symbols which may precede the allocation classification numbers: "USA" for the Army; "USN" for the Navy and the Maritime Commission; "LL" for Lend-Lease; "FP" for other foreign purchasers; "DP" for domestic purchasers.

WPB says that it is essential that these classifications be applied not only to all orders to be placed in the future but also to existing orders already placed. Each business is asked to review its orders and classify them, advising each supplier classification symbol assigned. Transmitted symbols should be passed on.

Army, Navy and Maritime Commission procurement officers are requested by WPB to advise their prime contractors as to what allocation symbol should be applied to the purchase orders that these services have already placed. Classification inquiries may be addressed to the nearest WPB field office, or to Washington.

Do you have a **METAL FINISHING** *Problem?*

DO YOU NEED INFORMATION

You may have a war material contract calling for plating, anodizing, or special finishing of certain parts.

Tell us about your problem.

We can help you with information—accurate, quick, dependable information on how the job can be best handled.

WE HAVE EXPERIENCED MEN! Our chemists and engineers know their business. They know processes and equipment. Metal finishing problems are their speciality.

WE HAVE EQUIPMENT AND SUPPLIES! Udylite has a complete line of supplies and equipment for plating, anodizing, cleaning, pickling, metal finishing. A few equipment items are shown on the opposite page. Every Udylite product is of the highest quality—designed for dependable, efficient production.

WE CAN WORK FAST! We know you are in a hurry and our organization is geared accordingly. We'll give you information promptly—we can make quick delivery of supplies and equipment. If you plan an expansion or a completely new plant—or want a figure for estimating purposes, let us know about it. We'll be glad to help you.

ON THESE?

★ ★
ELECTROPLATING

★ ★
ANODIZING

★ ★
CLEANING

★ ★
PICKLING

★ ★
POLISHING

★ ★
COLORING

THE UDYLITE CORPORATION

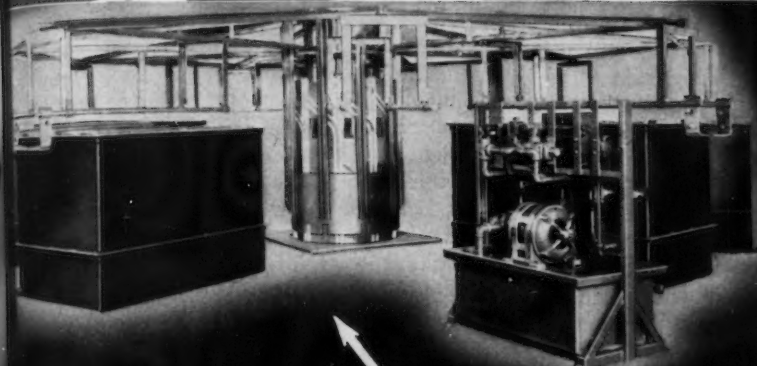
1651 E. Grand Blvd., Detroit, Mich.

Chicago
1943 Walnut Street

Long Island City, N. Y.
11-16, 44th Drive

Cleveland
4408 Carnegie Ave.

UDYLITE



ROTARY TYPE, FULL AUTOMATIC CONVEYOR carries racked parts through entire sequence of dipping or immersion operations. Now used for electroplating, special cleaning and pickling, heat treating, anodizing and black finishing.

AUTOMATIC BARREL PLATING MACHINE automatically processes large quantities of small parts in bulk, through required cleaning, rinsing, pickling, plating, drying operations. Now used to clean, pickle and oil shell case parts.



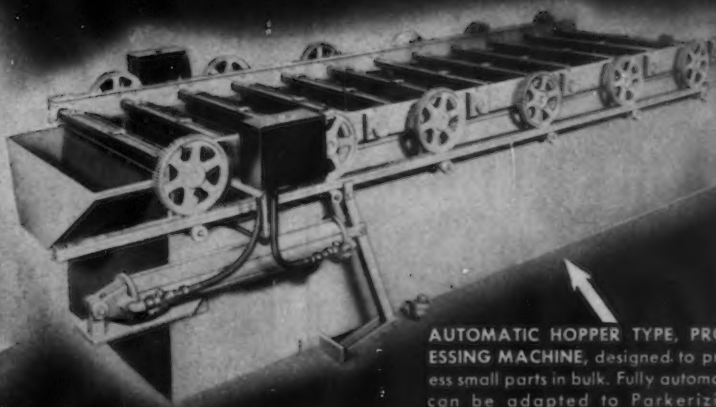
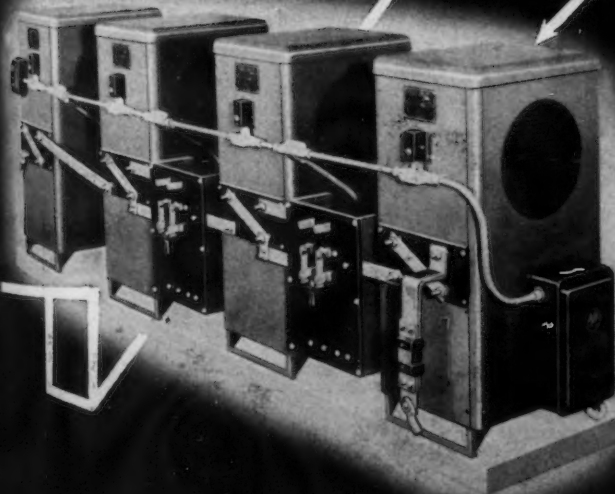
SEMI-AUTOMATIC PLATING CONVEYOR brings plated work to operator who loads and unloads machine at one spot. This machine saves labor, permits close production and process control through regulation of chain drive.



★
Here are a few typical pieces of Udyllite metal finishing equipment which are helping to **SPEED UP** war production. Put them to work for you!

UDYLITE MALLORY RECTOPLATERS—Individual units are rated at 1440 amperes at 6 volts or 720 amperes at 12 volts. Connected in series for anodizing (as shown), total rated output of 720 amperes at 48 volts is obtained. Practically any combination can be furnished to produce the desired plating or anodizing current.

Carried in stock for immediate shipment.



AUTOMATIC HOPPER TYPE, PROCESSING MACHINE, designed to process small parts in bulk. Fully automatic, can be adapted to Parkerizing, black finishing, immersion plating or special dip processes.

400% MORE EFFECTIVE . . . SPRINGS BY *Holly*

●In cooperation with a manufacturer of guns our engineers redesigned the loading mechanism with the result that the life of our spring now equals that of the weapon . . . a 400% increase in its effectiveness. This "know how" and resourcefulness are ready to work for you. Write, wire, or better still . . . phone us.



When ability to give hard, continuous service counts, call for HOLLY quality springs.

**AMERICAN
SPRING & MFG.
CORP.**
OF *HOLLY*
HOLLY, MICHIGAN

NEWS OF INDUSTRY

Westinghouse Merchant Marine Plant Dedicated by Vickery

Philadelphia

••• Speaking before a group of government officials and war workers in the new Merchant Marine plant of the Westinghouse Electric & Mfg. Co., during the dedication ceremonies on May 22, Admiral Howard L. Vickery, vice-chairman of the Maritime Commission, declared that "America today has more active shipbuilding capacity than all the rest of the world combined," and that this capacity "is the answer to the Axis dictators."

He cited President Roosevelt's call for the nation to deliver into war service by the end of next year 23,000,000 deadweight tons of new merchant shipping, and declared that no shipbuilders of any nation ever tackled so big a job before, but that we'll do the job.

In 1937, when the Maritime Commission came into existence, he said, there were but ten shipyards in this country capable of producing ocean-going vessels of 400 ft. or more in length, and half of this capacity was taken up with Naval construction. Today, he pointed out, American merchant ships are being built by about 60 shipyards on all three coasts and on the Great Lakes. In three quarters of these yards, he disclosed, "vessels averaging 10,000 tons deadweight are coming off the ways right now fast enough so that we can deliver them two a day into service."

So efficiently have modern mass

production methods been applied to shipbuilding, Admiral Vickery added, that ship production time, from keel-laying to delivery, has been cut from original schedules of five months to three and one-half months, and would soon be slashed to the point where new merchant vessels will go into service less than 75 days from the time their keels are laid.

The new Westinghouse managed plant turned out its first turbine parts the middle of last January, just 65 days after the erection of the first steel columns on Armistice Day, 1941, thus setting a record. Ground was broken at the tract on the eighth of August, 1941. The plant was built at a cost of \$26,000,000 with funds supplied by the Defense Plant Corp., and is operated by Westinghouse for the Maritime Commission.

Purchasing Agents Are Told War Output Exceeds Hopes

••• War production is coming along better than expected and will be limited only by the scarcity of vital materials, 2400 delegates to the convention of the National Association of Purchasing Agents were told this week in New York.

Donald Nelson, WPB chief, made the principal address, in which he proclaimed wasteful practices as treason. Other speakers stressed that war supersedes all else; that output of non-essential goods will be cut sharply and that new controls are coming.

KEEPS 'EM SAILING: For excellence in the production of ship gear drives for the Navy, all three plants of Farrel-Birmingham Co., at Ansonia and Derby, Conn., and Buffalo, were awarded the Navy "E" burgee on May 10.



NEWS OF INDUSTRY

Engineers to Study Plane Parts at Special Meeting

Detroit

••• A special meeting on war production of aircraft will be staged in Detroit on June 8 under joint sponsorship of the Detroit Section of the Society of Automotive Engineers and the Engineering Society of Detroit. It will include three technical sessions and a day-long exhibit of vital aircraft parts which is being especially prepared by the Ford Motor Co. to illustrate changes made in designs and methods, and the application of automotive manufacturing processes to attain quality production on mass output.

The meeting is one of those which will compensate SAE members for the cancellation of the annual summer meeting at White Sulphur Springs.

The technical meetings and exhibit will be in the Horace H. Rackham Educational Memorial.

The technical papers will be presented by H. C. Karcher and J. Dolza of Allison Division, General Motors Corp., on "Correlation of Ground and Altitude Performance of Oil Systems;" W. G. Ovens, Wright Aeronautical Corp., on "Some Notes on the Design of the Japanese Mitsubishi-Ginse I Engine" and Theodore P. Wright, assistant chief aircraft branch, WPB, on "Our War Production Effort in Aircraft."

The exhibit, based on Ford aircraft production activity will include U. S. engines, Axis engines, and Ford experimental liquid cooled plane and tank engines, along with a group of historic engines from the Edison Institute Museum, Greenfield Village. A parts display will show centrifugal castings which replace steel forgings and steel castings which may replace aluminum forgings and castings. Other parts will be plastics, suggesting replacement of aluminum and steel; air frame parts and a breakdown to show how transportation and re-assembly of air frame parts have been simplified. Special trailer equipment being used to transport aircraft sub-assemblies to distant parts of the country and an exhibit showing participation of Ford village industries in war work.

In conjunction with the main exhibit there will be a complete display of SAE aeronautical standards committee work.

GLASS

HANDLE WITH CARE ...OR ELSE!

AND HERE'S WHY! It's glass for safety devices that protect workers from blinding chips of metal, flying sparks and gas fumes. It's glass for the goggles and gas masks that keep men on the job—fighting the TOTAL WAR for production.

Of course, all Reading Electric Hoists are not given dramatic jobs like this. But no matter what the job turned over to your Reading Electric Hoist, it will be done well and without fail.

"No parts replaced in three years." and "It just needs an occasional oiling." are typical remarks from users who have found that it pays to standardize on Reading Electric Hoists—whatever the capacity requirements from ½-ton to 2 tons. When results and savings are in your specifications, rely on Reading's engineering ability.

TO HELP YOU solve your materials handling problems we have issued a handy booklet, "144 Answers to Your Hoisting Problems". A copy is yours for the asking.

READING CHAIN & BLOCK CORP.
DEPT. A-6 READING, PA.

READING

Chain Hoists, Electric Hoists,
Cranes and Monorails

GOES PRODUCTION

UP
DOWN



N COME COSTS

... when a Conco
Torpedo Electric Hoist
Goes To Work On A
Job!

Available in capacities of
250-lb. — \$139.50, 500-lb. —
\$149.50 and 1000-lb. —
\$159.50. Equipped with
Push Button Control for
fast, safe, one-hand operation.



Simply, Heavily Built
For . . . — Production

Compare These Features
in hoists of equal price: 1.
Push Button Control. 2.
Hook, bolt or trolley suspension. 3. Simple, heavy
construction employing
only two gear reductions. 4. Positive Limit Switch. 5.
Double Cast Iron Drums,
30 times diameter of flexible
plow steel cable. 6. Gear
shafts operate on ball
bearings in an oil bath.
Write today for illustrated
bulletin #2600C giving
complete specifications.

CONCO

ENGINEERING WORKS

Division of
H. D. Conkey & Company
Orange Department—Mendota, Ill.



How *NOT* to Cut Corners on Priorities

Do you apply low priority ratings because they're easier to extend? True, some ratings require less clerical work to extend than do others—but the few minutes clipped from office routine may be lost ten times over if your order is deferred!

If you're entitled to an A-1-a, use it. Applying an easier-to-extend A-10 may delay your steel, and *cost you hours of lost production.*

Next time you order steel, apply the highest rating to which you're entitled. You'll not only avoid unnecessary deferment of your order—but prevent production stoppages as well.

Meanwhile, one way in which you *can* cut corners—is to put your priorities problems up to the new Priorities Division of *Peter A. Frasse and Co., Inc.*, 17 Grand St., N. Y. C. (Walker 5-2200) • 3911 Wissahickon Avenue, Philadelphia (Radcliff 7100—Park 5541) • 50 Exchange St., Buffalo (Washington 2000) • Jersey City, Hartford, Rochester, Syracuse, Baltimore.



Frasse Mechanical Steels

SEAMLESS STEEL TUBING • COLD FINISHED BARS
STAINLESS STEELS • WELDED STEEL TUBING • DRILL ROD
COLD ROLLED STRIP AND SHEETS • SAE ALLOY STEELS

100—THE IRON AGE, May 28, 1942

Sayre Given New Post In WPB Auto Section

Washington

• • • John S. Sayre, Detroit, has been named head commodity specialist in charge of the WPB Automotive and Trailer Equipment Section, Purchases Division. His duties will be to serve as consultant to the procurement offices of the Army, Navy, Treasury, Maritime Commission and other government agencies, and to coordinate the purchasing program of the several procuring agencies for the commodities on which he is specialist.

He came to the WPB from the Fruehauf Trailer Co., Detroit, where he was manager of the defense division. He worked with the Army and Navy in designing and procuring automotive and trailer equipment for their needs, and served also as regional manager in charge of 11 factory branches. Prior to that, he was vice-president of the Highway Trailer Co., Edgerton, Wis.

Night School for Executives Will Cover OPA, WPB Rules

Chicago

• • • A night school on war problems for plant executives is being sponsored here by the Illinois Manufacturers' Association. Six meetings will be held at the LaSalle Hotel on Friday evenings.

They will be in the nature of round table discussions and will cover contracts, export sales, handling of appeals for relief from WPB orders and OPA price schedules, records and reports required, government secret and restricted contracts, special-built equipment, determination of "established prices," etc. WPB and OPA officials will lead the discussions.

Harrison Heads Board Reviewing Expansions

Washington

• • • W. H. Harrison, Director of WPB's Production Division, was appointed last week as chairman of the board which is reviewing plant expansion projects, some of which will be curtailed or abandoned.



NEW NMTA HEAD: Roe S. Clark, vice-president and treasurer of Package Machinery Co., Springfield, Mass., was elected president of the National Metal Trades Association at the group's 44th annual convention in New York last week.

90% of Industry Will Be Under PRP on June 30

Washington

• • • Approximately 90 per cent of all industry will be brought under the Production Requirements Plan by June 30. Plans to abolish existing "P" orders have been in progress for months. "The Allocation Classification," formerly reported in THE IRON AGE (see issues of Jan. 22, page 71, March 26, pages 80 and 116, and April 9, pages 138-139), as the End Use Code will become a part of the principal application form under the Production Requirements Plan, PD-25a. This will have the effect of eliminating the "PD forms" formerly used in the "P orders" which will be abolished at that time.

Reese Taylor Begins Work As Head of Steel Branch

Washington

• • • Reese H. Taylor took up his duties on Monday as chief of the WPB Iron and Steel Branch.

Manganese Steel is Conserving Metal for Many Industries—and the Nation . . .

Industries employing equipment whose parts are subjected to heavy impact and abrasion are contributing to the proper employment of all steel by using genuine manganese steel, "the toughest steel known," in applications where its great economy has been proved. Castings of this wear-resistant metal *seldom give less than twice the service life of ordinary rolled or cast steel* and often outlast them ten to one in the most abusive services.

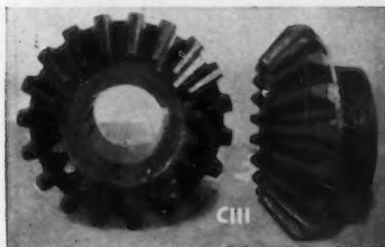
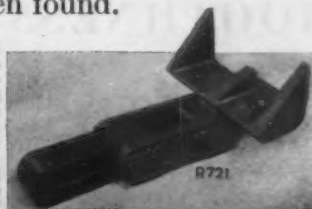
Continuous operation of equipment is an important consideration, also, in addition to savings in man-hours and metals through minimized maintenance and replacements.

Manganese Steel castings are strong and ductile throughout, but under

repeated impact or heavy pressure they work-harden on the surface in use. Thus a hard, abrasion-resistant surface is presented with a tough backing which absorbs impact, withstanding stresses under which "hard through" steels would fracture.

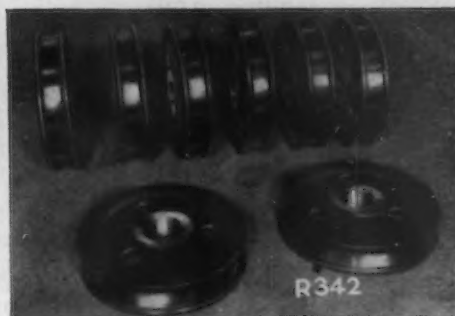
Several examples of the remarkable performance of genuine 13% manganese steel equipment parts are exhibited here. This steel is not recommended for structural, load carrying, or other everyday applications where ordinary steels are adequate, but where impact and abrasion are severe no steel as suitable and economical as manganese steel has yet been found.

R-721—A sawmill superintendent states: "Manganese steel log haul chain of pinlock design, that we are using, has lasted 9 times longer than the heat-treated steel roller type chain it replaced."



C-111—"27 years' service on 6ur roll table line shaft," reports the master mechanic of a blooming mill, "And they're still running," praising Amsco manganese steel gears like these pictured.

R-342—A car builder recently reordered these manganese steel crane wheels to replace identical wheels that had been in service 21 years in their foundry.



Amsco
AMERICAN MANGANESE STEEL DIVISION
OF THE AMERICAN BRASS SHOE & FOUNDRY CO.
Chicago Heights, Illinois

FOUNDRIES AT CHICAGO HEIGHTS, ILL.; NEW CASTLE, DEL.; DENVER, COLO.; OAKLAND, CALIF.; LOS ANGELES, CALIF.; ST. LOUIS, MO. OFFICES IN PRINCIPAL CITIES

Manganese Steel Castings for shocks and abrasion.
Chromium-Nickel Alloy Castings for heat and corrosion resistance.
Power Shovel Bippers, Dredge and Industrial Pumps.
Welding Materials for reclamation and hard-surfacing.

April Bookings for Fabricated Steel Largest Since 1929

••• New orders for fabricated structural steel booked during April, amounting to 327,420 tons, were the largest in volume of any month since 1929, according to the American Institute of Steel Construction. The total of new orders booked during the first four months of 1942 amounted to 987,814 tons, or 12.4 per cent increase

over 1941. During April of last year, 218,018 tons were booked, with 248,319 tons for March, 1942.

Shipments of fabricated structural steel during April were 176,894 tons, compared with 191,262 tons in March, and 189,751 tons in April of last year. Total shipments for the first four months of this year were 700,508 tons in contrast to 685,856 tons shipped during the first four months of 1941.



• • • Unequalled SURFACE SMOOTHNESS and SPHERICITY

The series of lapping operations performed as a matter of course in the Strom plant give Strom Steel Balls a degree of surface smoothness and sphericity that has always been unequalled in any other regular grade of ball. Only through such unique lapping practice can extreme precision be obtained.

Physical soundness, correct hardness, size accuracy, and sphericity are guaranteed unconditionally in all Strom Balls.

Other types of balls—*stainless steel, monel, brass and bronze*—are also available in all standard sizes. Write for catalog and prices.

Strom

STEEL BALL CO.

1850 So. 54th Avenue, Cicero, Ill.

The largest independent and exclusive Metal Ball Manufacturer

Union Security Adopted At Harvester Co. Plants

Chicago

••• In the first referendum on the controversial union security issue, a majority of union members of eight midwestern plants of International Harvester Co. voted last week to bind themselves to payment of all union dues for the duration of the war, under penalty of being discharged for failure to do so. The result of the Harvester voting means that the union can force the company to discharge any union member who fails to pay dues or who refuses to abide by union rules.

The elections, ordered by the National War Labor Board, brought out only 10,703 members out of a total claimed union membership of 17,155 men. Of the 10,703 men voting 9703 voted in favor of union security and 10,000 voted no.

Assails Union Security As Anti-Democratic

St. Louis

••• Declaring that the expression "union security" was a synonym for "closed shop," Clarence B. Randall, vice president of Inland Steel Co., told a meeting of the Illinois Bankers Association last week that the union security issue is the direct antithesis of democracy. "It tells a worker that a man can't get out once he's in the union," he said.

Urges Business Men to Assist Priority System

••• C. F. Hood, president, American Steel & Wire Co., called upon business men to work conscientiously to obtain the full objectives of the system of allocations and priorities which has been set up to channel materials to supply war requirements successfully. He addressed the convention of the American Supply and Machinery Manufacturers Association at Atlantic City.

"It is highly important," Mr. Hood said, "that each and every one of us realize and recognize the extent to which the operation of such a system will affect our own specific industry or business." He stressed the duty of each individual to keep informed on developments and said, "This is not the time to wait for someone from Washington to call upon us personally and ask for this and that."

A-9 Rating Needed Under Order L-123

Washington

••• No one may accept any order for or deliver any general industrial equipment in the 14 classes set forth in Order L-123 issued by WPB on Tuesday except upon a preference rating of A-9 or higher or upon specific authorization by WPB. The order affects such machinery as passenger and freight elevators, electric motors of more than 1 hp, industrial fans, compressors and pumps and a number of other classes of machinery used in various industrial operations. Some types of machinery within these classes are covered by other WPB orders and are therefore not restricted.

Under L-123 manufacturers may ship machinery to distributors only to fill approved orders actually received by distributors or to replace machinery delivered by a distributor on an approved order.

Manufacturers and distributors who have orders on their books which do not fall within the approved classifications may appeal to WPB for permission to dispose of their orders by listing them, giving the name of the prospective purchaser or lessee, complete description of the machinery and its value, the use for which it is intended, etc.

Restrictions contained in the order do not apply to deliveries of repair parts worth less than \$1000 for use in maintaining a single piece of existing equipment, or repair parts worth more than \$1000 in cases where an actual breakdown or suspension of operations has occurred.



Merchant Wire Products

Washington

••• Amendments to Orders M-21 and M-21-b to permit the sale on unrated orders of fence wire, barbed wire, poultry netting, fence posts, gates, staples and corrugated roofing and siding have been issued by WPB, it was announced May 26. These items are added to nails, bale ties and small

pipe on which no priority ratings are necessary for sales from warehouses and dealers.

The action was taken because these items are constantly used by farmers and householders for maintenance and repair. An optional change in the quota basis for wire and wire products delivered to warehouses was made in the amendment to M-21-b.

Rating Extended

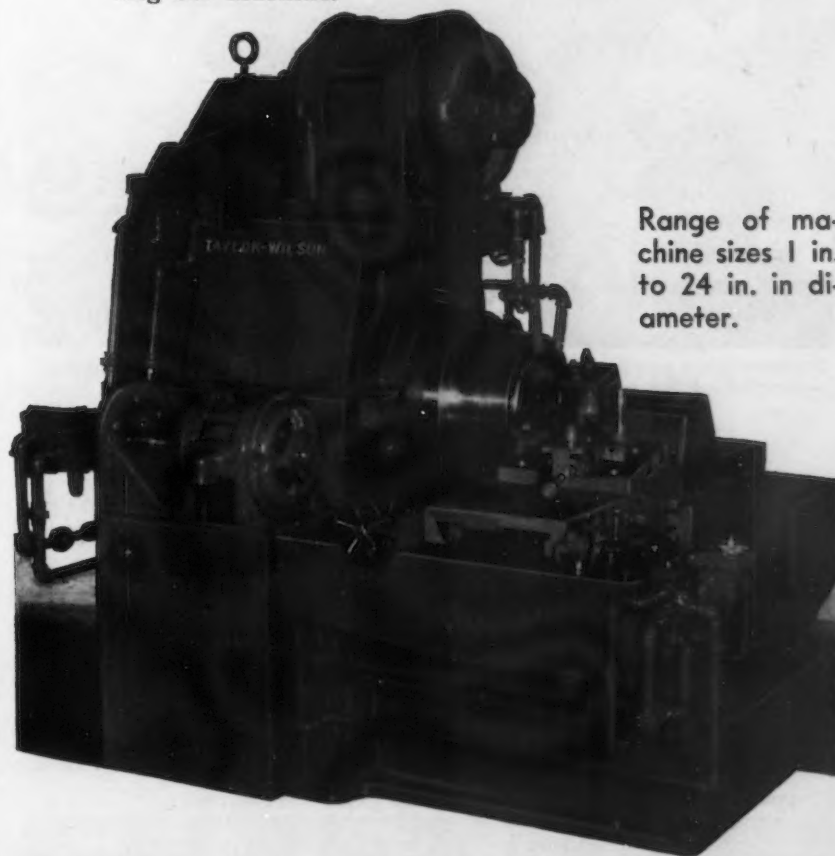
Washington

••• The A-3 preference rating made available under Order P-54 for deliveries of materials going into the manufacture of buses and truck trailers and buses and cabs for medium and heavy trucks has been extended to June 30, WPB announced on Tuesday.

TAYLOR-WILSON CUTTING-OFF MACHINE

*Assures Speed and Accuracy—
Vital Factors in War Production*

The operation of cutting off pipe or tubing for Coupling Stock, Roller Bearing Blanks, Bomb Blanks, and other essential items in set lengths can be maintained at maximum speed and absolute precision with the sturdy, quick-action, yet always dependable Taylor-Wilson Cutting-Off Machine.



Range of machine sizes 1 in. to 24 in. in diameter.

TAYLOR-WILSON MFG. CO.
25 THOMSON AVE. McKEES ROCKS, PA.
(Pittsburgh District)

Ore Vessels Restrained From Carrying Coal

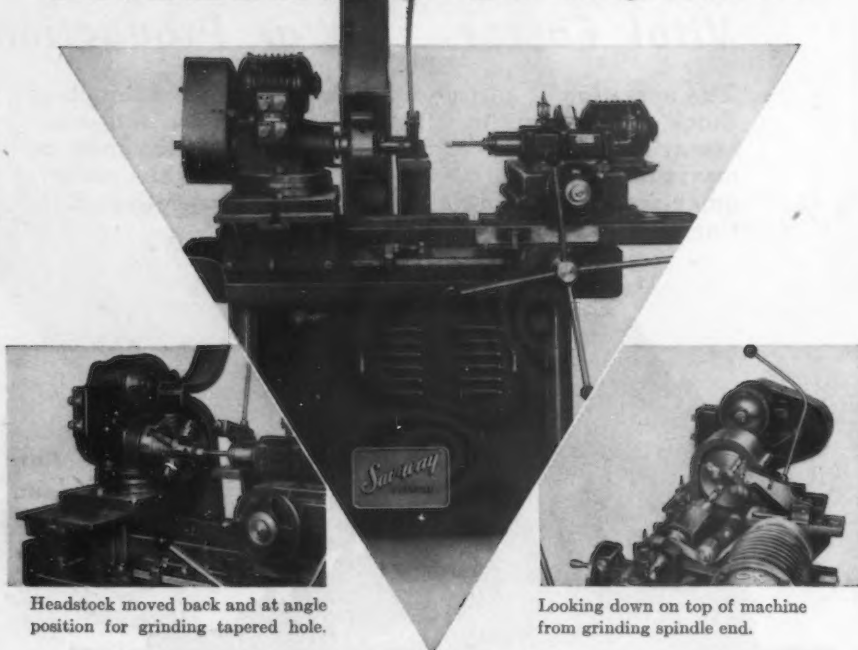
Washington

••• To assure maximum capacity for the transportation of iron ore, the Office of Defense Transportation issued an order prohibiting certain Great Lakes coal movements. One ODT spokesman said the order would make Great Lakes shipping facilities available for

the shipment of an additional 2,000,000 tons of ore.

Great Lakes carriers are forbidden, under the terms of the order, to move coal from any Great Lake port to: (A) any port on the Detroit and St. Clair Rivers South of and including Port Huron; (B) the Chicago area; (C) any port on Lake Erie and Lake Ontario, and connecting or tributary waters, unless authorized by special or general permits.

Saw-way MULTI-PURPOSE INTERNAL GRINDER



Headstock moved back and at angle position for grinding tapered hole.

Looking down on top of machine from grinding spindle end.

Offers greater flexibility . . . a precision grinder, designed and built by engineers with years of practical experience to guide them . . . has a headstock traverse of 6" . . . grinds holes $\frac{1}{4}$ " to 18" in diameter . . . holes up to 9" deep, straight or tapered . . . entire headstock may be moved at right angle to wheel traverse, by merely loosening two conveniently located nuts . . . worm compensating device permits grinding wheel head adjustment to .0001 . . . sturdy construction throughout . . . full specifications, delivery time and price on request.

134 Distributors in U. S. and Canada to serve you.

Saw-way TOOL AND MACHINING CO.
13834 JOS. CAMPAU AVE. DETROIT, MICHIGAN

Western Pa. Auto Yards Sell 16,686 Tons of Scrap

••• Approximately 16,686 tons of scrap representing the contents of 173 auto wrecking yards in Western Pennsylvania have already been sold, according to J. C. Harris, WPB automobile graveyard section head for this district. Close to 6000 tons of scrap have already been moved out of the yards.

The government is encouraging auto wreckers to stay in business and purchase additional 'junked cars in order to fill up their yards as fast as space is available, even though the graveyard section is insisting on a 60-day turnover. Mr. Harris made public the names of 15 Pennsylvania dealers and the tonnage which they moved during the month of April:

Dealer	Tons
Robert Amper, McKeesport	800
Butler Iron & Steel, Butler	686
Glosser & Sons, Johnstown	420
Pennsylvania Iron & Metal, Pittsburgh	282
M. N. Adelson & Sons, Ford City	265
Columbia Iron & Metal, Pittsburgh	205
Charles Horewitz, Butler	189
United Iron and Metal, Pittsburgh	177
Altoona Auto Accessories, Altoona	150
Union Junk and Metal, Erie	149
Monongahela Iron & Metal, Monongahela	138
Lieberman Gardy, Sharon	138
J. Flingeret, Ambridge	129
S. Hausman & Sons, Pittsburgh	121
Erie Iron & Supply, Erie	118

CHRISTENS SHIP: In a driving rainstorm, Mrs. Irving S. Olds, wife of the chairman of the board of directors, U. S. Steel Corp., is shown christening the Great Lakes ore-carrier "Irving S. Olds" at the launching here on National Maritime Day, Friday, May 22.





WRECKING RAILROAD: Demolition has started on the 52 miles of track, 28 bridges and 706 double steel towers of the New York, Westchester & Boston Railroad, idle since December, 1937. Uncle Sam bought it for scrap—15,000 tons, \$432,600—turning it over to a private contractor. The rails and steel structure are to be used for railroads to Army camps.

Unit for Briquetting Steel Turnings at Canton Planned

Cleveland

• • • It is reported that Republic Steel Corp. will spend about \$250,000 at Canton, Ohio, to set up a unit for removing oil and other chemicals from turnings and then briquetting them. This development is indicative of the large volume of turnings becoming available in this area, and of the general necessity for preparing the turnings for suitable handling at open hearths or blast furnaces.

The movement of scrap from auto graveyards continues generally favorable, particularly in the Greater Cleveland area where a very aggressive drive is being

made in this direction. Lake movements of scrap are expected to be few and far between, partly due to the fact that no scrap had been accumulated at docks in the upper lakes for shipment by boat, and had been moved by rail instead.

Most observers believe that the move taken by the government in licensing scrap dealers will be a favorable one for the industry, as a whole. However, thus far no forms for making license applica-

tions have been made available here.

The continuing critical situation in the Youngstown district bears out the general contention of scrap dealers over a number of years that the area was in a peculiar "pocket" due to its location, and would always be in a relatively unfavorable position. Whether or not higher prices or some other incentive might aid the movement to this district is a moot question.



DEPENDABILITY is a vital requirement in Ore Transfer Cars

Today's machinery, in order to meet the demands of our 24-hour a day schedules, must be dependable.

Atlas Ore Transfer Cars are of Heavy-duty construction throughout, to assure continuous and efficient operation.

Complete sizes and types to meet all operating conditions.

★ ★ ★ ★ ★

Blast Furnace Scale Charging Cars

Skips • Ore Transfer Cars

Diesel-Electric Locomotives

The ATLAS CAR & MFG. CO.

ENGINEERS

MANUFACTURERS

1100 IVANHOE RD.

CLEVELAND, OHIO, U. S. A.

New OPA Actions Reflect Stricter Steel Price Policy

• • • Permission to charge higher than maximum prices was withdrawn last week from two steel companies by OPA, which continued its investigation of steel profits and prices over a broad front, paying particular attention to extras. In connection with the

latter, however, realization is growing that new steels, new customers and new requirements of old customers have altered the picture considerably since the freeze date specified by Price Order 6.

Central Iron & Steel Co. of Harrisburg, Pa., which on May 22,

1941, was granted permission to charge a maximum price for steel plates of \$2.35 per hundred lb., base, at established basing points, last week was ordered to restore the \$2.10 per hundred lb. maximum base price provided in Revised Price Schedule No. 6 on such iron and steel products.

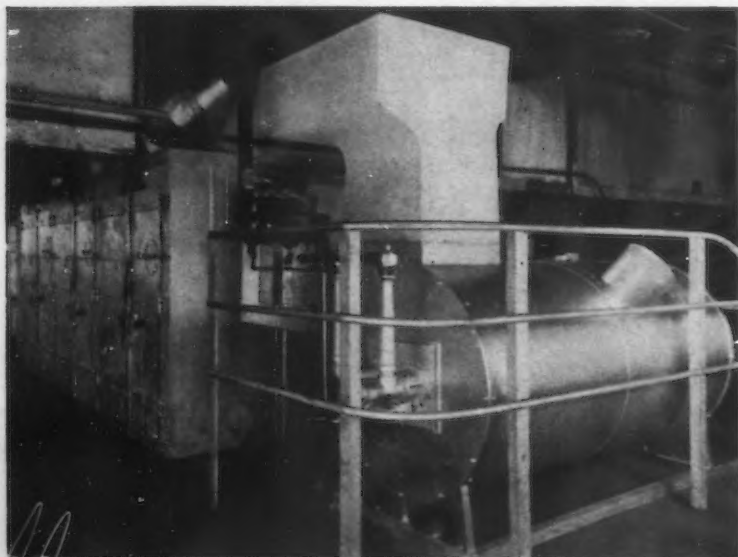
Eckels-Nye Steel Corp. of Syracuse, N. Y., which since September 17, 1941, has been permitted to charge \$2.50 per hundred lb. at established basing points for rail merchant bars, base grade, was ordered to charge not over \$2.40 per hundred lb. for the bars. While a reduction from the previous allowable price, the new price the company may charge is still higher than the \$2.15 per hundred lb. maximum provided in Revised Price Schedule No. 6.

Instructions to Central Iron & Steel and Eckels-Nye Steel to reduce prices on the stated products are contained in Orders No. 9 and 10, respectively, under Revised Price Schedule No. 6. The orders become effective May 23, 1942.

Commenting on the price action, Price Administrator Henderson said:

"Since relief is granted in order merely to bring a producer out of the loss columns, and not to guarantee a high rate of profit, clearly the relief should be reduced."

OPA reported that Central shipped 20,332 net tons in February, 1942, and had net sales that month of \$1,064,314, while in January, 1942, shipments were 20,976 net tons and net sales were \$1,128,614.



How TO GET MORE WORK out of Old Style Core Ovens

MAEHLER Recirculating Airheat Conversion Units will put new life into old style ovens, increase output and improve the quality of your work to such a degree that you may be able to meet war production demands without the expense and delay of installing additional oven capacity. Here's a typical example: A large Midwestern foundry with 4 coke fired brick rack ovens found that increasing work required output equivalent to that of two more of the same type of ovens. However, after consultation with Maehler engineers, they installed a Maehler Oil Heat Conversion Unit for just two of the old ovens and got all of their required work out of these two, leaving the other two old ovens as excess capacity!

It will pay you to investigate this possibility. Maehler engineers will be glad to help you do the job with existing equipment if it can be done.

THE PAUL MAEHLER CO., 2212 W. Lake St., Chicago

MAEHLER

WRITE FOR New Maehler
Heat Treating Furnace
Bulletin!

Gray Iron Castings Prices

• • • The formal price schedule on gray iron castings, expected to be announced "soon," probably will set the freeze level back several months from the March level which the industry is adhering to now temporarily under the General Maximum Price Regulation.

OPA economists are understood to hold the feeling that such action will be necessary because many foundry customers are being held to October, 1941, price levels, including practically all machinery producers. Also, the basic level governing nonferrous foundry prices is Oct. 1-15, 1941.

Meanwhile, Order No. 1, under

terms of the General Maximum Price Regulation establishes a formula for computation of maximum prices for gray iron castings, as follows:

(a) Specific authorization is hereby given to any producer of gray iron castings to determine the maximum price for any gray iron casting produced by him and for which the maximum price cannot be established under section 1499.2 of the General Maximum Price Regulation by the following formula: The producer's maximum price for each such casting shall be a net price (after adjustment for all applicable customary extra charges, discounts or other allowances) not in excess of that at which he would have sold such a casting during March, 1942, under the pricing formula or method of calculating price used by him in March, 1942, employing the same cost factors (wage rates, prices of materials and overhead) and profit margins which were in effect for him in March, 1942, even though his costs or profit margins may have increased since that date.

(b) On or before the last day of each month, beginning with June 30, 1942, a seller shall report the prices of all gray iron castings priced under the General Maximum Price Regulation, during the preceding month to the OPA in Washington, upon a form to be supplied. Each price so reported shall be subject to adjustment at any time by the OPA.

The first action on gray iron casting prices was an OPA request that the industry freeze all old business at Feb. 4, 1942, levels and price new business as of Oct. 1, 1941. Later, the General Maximum Freeze formed the base for prices.

The industry has been complimented widely for presenting an intelligent case covering its production, costs and profits. Nineteen committees from the industry assisted a national gray iron foundry committee of seven persons in preparation of the data. Wage conditions in the South were gone into at length.



Bolt and Nut Schedule Based On Oct. 1, 1941, Levels Washington

• • • Established at Oct. 1, 1941, levels, OPA on May 20 announced manufacturers' maximum prices for bolts, nuts, screws and rivets, with the exception of cap and set screws, whose prices were fixed at those prevailing on June 1, 1941. Effective May 28, the prices are set forth in Maximum Price Regulation No. 147, on ferrous and non-ferrous bolts, nuts, screws and rivets.

The OPA issued with the regulation a simplified stock list of

standard sizes of bolts, nuts and other fastenings. The list reduced the number of stock sizes from approximately 450,000 to 250,000.

With one exception, delivery charges and allowances provided in the new price regulation are those adopted by the industry in its basing point system. The one exception is the provision allowing a manufacturer to make a charge for all-rail freight to the

Pacific Coast insofar as the cost exceeds the amount of freight which, in general, would normally have been absorbed by the producer if the shipment had been made by rail and water.

Sales for export to purchasers outside the continental United States are covered by the Maximum Export Price Regulation, which was issued on April 25.

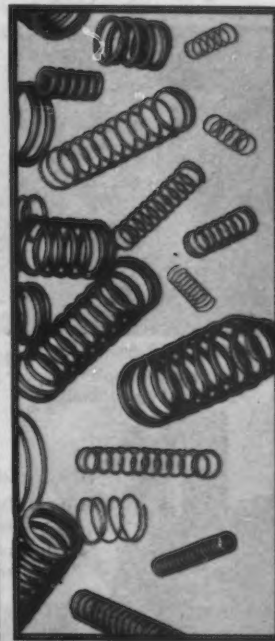
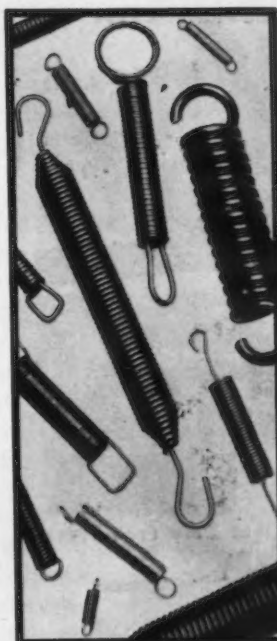
Sales of items that are packed

SPRINGS ARE AT WORK



In Millions of Guns, Tanks, Planes

FEW INDEED are the modern mechanized war machines that do not depend on the humble but vitally important spring, wire assembly or wire part . . . they work in the very heart of war equipment tripping, pulling, pushing, releasing, absorbing shocks, etc., in fact, springs and wire parts are indispensable to modern mechanized warfare.



IF YOU NEED SPRINGS FOR WAR JOBS

Cuyahoga's broad experience in designing and manufacturing springs, wire parts and small stampings is available for direct war or sub-contractor requirements.

CUYAHOGA SPRING CO.



10900 BEREA ROAD
CLEVELAND, OHIO

for export but which are sold to export merchants located in the United States, or to the government or one of its agencies, such as for lend-lease shipment, are specifically covered by the new maximum price regulation. On sales to the government, such as lend-lease sales, a deduction equivalent to the customary export merchants' commission is to be

made in computing the maximum prices.

The regulation orders that any commission, functional or other discount or term of payment that was or would have been customarily allowed by the seller between Oct. 1 and Oct. 15, 1941, to other producers, distributors or to specific classes of purchasers shall be continued.

Industrial fastenings made from

aluminum, as well as nails, tacks and washers made of any metal, are specifically excluded from the regulation.

The bolt and nut price schedule has been "in the works" at the OPA factory in Washington for months. It was one of the most difficult to promulgate due to the thousands of types, sizes and specifications which the industry produces. Fortunately, the bolt and nut industry gave excellent cooperation to OPA officials which enabled announcement of the schedule much sooner than would have been possible under other circumstances.

Highlights of the price schedule include:

On sales in the U. S. for domestic consumption, maximum prices are the amount not in excess of the equivalent of the applicable list price schedules and extras in effect between Oct. 1 and Oct. 15, 1941, and published by any or all of the following producers, less the applicable discounts set forth in Appendix E of the new price schedule:

American Screw Co.; Atlas Bolt & Screw Co.; Bayonne Bolt Corp.; Bethlehem Steel Co.; Buffalo Bolt Co.; Central Screw Co.; Champion Rivet Co.; Clark Bros. Bolt Co.; Cleveland Cap Screw Co.; Continental Screw Co.; Erie Bolt & Nut Co.; Corbin Screw Corp.; Federal Screw Works; Ferry Cap & Set Screw Co.; Lamson & Sessions Co.; Milton Mfg. Co.; National Lock Co.; National Screw & Mfg. Co.; Oliver Iron & Steel Corp.; Wm. H. Ottemiller Co.; Charles Parker Co.; Pittsburgh Screw & Bolt Corp.; Republic Steel Corp.; Russell, Burdall & Ward Bolt & Nut Co.; Sheffield Steel Corp.; Townsend Co.

Commissions and discounts which are allowed customarily or which would have been allowed by the seller between Oct. 1-15, 1941, are to be deducted from the maximum prices. Where sales of any of the types listed in Appendix D and Appendix F are made for delivery on the Pacific Coast, the applicable discounts set forth in Appendix F (Pacific Coast discounts) rather than Appendix E are to be deducted. In computing the maximum prices the applicable delivery charges as set forth in Appendix C may be added. The maximum price for Parker-Kalon Corp. products listed in Appendix D must not exceed the equivalent of its applicable published list prices less applicable published discounts between Oct. 1-15, 1941.

DELIVERY CHARGES—Maximum prices set forth in the order are f.o.b. conveyance at seller's factory points. Maximum delivered prices are to be the maximum prices specified in the order plus the public carrier's charges to the extent actually incurred, except that in certain instances the applicable charges which shall be added are specified.

Appendix E—Discount Lists applicable other than Pacific Coast. The following discounts apply to bolts, nuts, screws and rivets made from ferrous metals unless otherwise specifically stated:



**Group I—Bolts and Nuts
Carriage and Machine Bolts**

Diameter	Lengths
1/2 in. & smaller	6 in. & shorter
9/16 in. & 5/8 in.	6 in. & shorter
3/4 in. through 1 in.	6 in. & shorter
1 1/8 in. & larger	all lengths
1/4 in. through 1 in.	longer than 6 in.
Lag bolts	
Plow bolts	
Step bolts	
Elevator bolts	
Tire bolts	

TRADE **AUTOMATIC** MARK

Manufacturers for Over Thirty Years

MODERN *Electric Propelled* **INDUSTRIAL TRUCKS**

FOR ECONOMICAL MATERIALS HANDLING

- **FORK AND RAM TRUCKS**
- **LOW AND HIGH LIFT TRUCKS**
- **COIL AND SHEET HANDLERS**
- **LOAD CARRIERS**
- **TRACTORS—CRANES**

Capacities 1000 to 60,000 lbs.



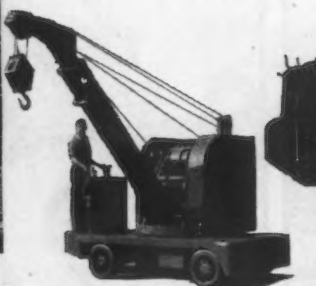
Fork and Ram Trucks
Telescopic and Non-Telescopic for
Pallet and Coil Handling



Low Lift Skid Platform Type



**High Lift
Skid
Platform
Type**



**Cranes—Motorized Slewing
Type—Four Motor Control for
Individual and Simultaneous
Operation**



**Die Handlers
Heavy Duty Type
with motorized die
and unloading
platform**



Light Duty Fork Trucks



Coil and Sheet Handlers

REQUEST DETAILS AND LITERATURE



Listed Under Reexamination Service of
UNDERWRITERS' LABORATORIES

AUTOMATIC TRANSPORTATION CO.

75 W. 87th St.

Div. of the Yale & Towne Mfg. Co.

CHICAGO, ILL.

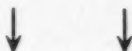
PRICES

Tacoma and Sioux Falls Added to Schedule 49

Washington

••• Tacoma, Wash., and Sioux Falls, S. D., have been added to "Listed Cities" recognized by OPA as distribution centers for iron and steel products sold from warehouses by Amendment No. 4 to Revised Price Schedule No. 49, OPA announced on Tuesday of this week.

A "Listed City" is defined as one recognized to have a seller or sellers stocked with a full and representative line of iron and steel products whose price lists may serve as basing lists for the cities.



Combat Items Excluded

••• Numerous combatant items used in warfare, together with certain metals, have been excluded from the terms of the General Maximum Price Regulation by Supplemental Order No. 4, issued May 18, when the "sales or deliveries" involved are to the United States or any agency thereof. Included in the list are:

1. Completely assembled combatant items, including aircraft, ammunition, armored vehicles, and others.
2. Parts and sub-assemblies of completely assembled items.
3. Ships and boats (completely assembled).
4. Completely assembled aircraft.
5. Military propellants and explosives.
6. Pyrotechnics — grenades, primers, fuses, and boosters.
7. Commodities manufactured pursuant to a government-authorized developmental contract or subcontract during the period of time required for the selection of a product by the purchaser or for the accumulation by the manufacturer of sufficient production experience to permit the setting of a firm price for such

commodity, or both, provided that when OPA determines the development period to be over, the exception shall not apply to subsequent deliveries of the commodity.

8. Commodities manufactured pursuant to contracts certified to OPA as secret contracts by the United States or agencies thereof.

9. Emergency purchases of less than \$1,000 for immediate delivery, by the United States or any agency thereof, of: (a) Any commodity needed for servicing or repairing any combatant item; (b) Completely assembled ships or boats; (c) Completely assembled aircraft; (d) Parts or sub-assemblies of completely assembled combatant items.

10. Brazilian rock quartz.

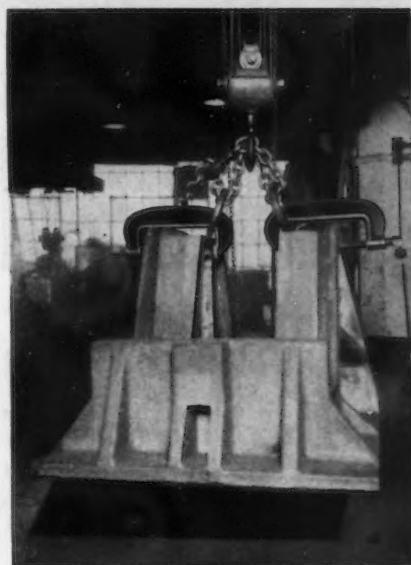
11. Metallic copper, lead, or zinc, or ores or concentrates thereof sold to the Metals Reserve Co.

12. Aluminum scrap sold to the Metals Reserve Co.

13. Sales or deliveries of nickel-bearing scrap to the Metals Reserve Co.

Persons who have entered into a contract or a subcontract with the United States or its agency, may file an application for adjustment of the maximum price established under the General Regulation if they believe such maximum

ARMSTRONG



DROP FORGED "C" CLAMPS

ARMSTRONG Heavy Duty "C" Clamps are used day in and day out to lift and carry these giant automobile body dies where the least spring, or slip in clamp or screw would spell disaster.



ARMSTRONG Heavy Duty "C" Clamps have strength and stiffness unknown in other clamps; have a uniform quality that can be safely depended on for not only ordinary, but extraordinary work. Heavy and correctly engineered designs with long hubs, extra large alloy steel screws and bodies drop forged from special steel, heat treated to give extra strength and stiffness.

You will find the same quality in ARMSTRONG Drop Forged "Medium Service," "Light Service," "Extra Deep Throat," and "Tool Makers" "C" Clamps—7 types each in all sizes. Write for Catalog C-39.

ARMSTRONG BROS. TOOL CO.

"THE TOOL HOLDER PEOPLE"

309 N. FRANCISCO AVE., CHICAGO, U. S. A.
Eastern Warehouse & Sales: 199 Lafayette St., New York



ARMSTRONG TOOL HOLDERS Are Used in Over 76% of the Machine Shops and Tool Rooms

Base Discount Less Case Lots	Full Case Allowance	Carload Allowance
65 1/2%	10%	5%
63 1/4%	10%	5%
61%	10%	5%
59%	10%	5%
59%	10%	5%
62%	10%	5%
65%		5%
56%		5%
56%		5%
50%		5%

price impedes or threatens to impede production of a commodity which is essential to the war effort. However, where such items are covered by other regulations such regulations are applicable.



Ore Firm Gets Relief

••• Moore & Crago, of Duluth, Minn., a partnership firm engaged

in the production of iron ore, has been granted relief by the OPA from its ceiling prices under Maximum Price Regulation No. 113, covering iron ore.

Price Administrator Henderson said that from a study of the concern's books for 1939, 1940 and 1941, it appears impossible for it to operate at ceiling prices. It was emphasized that the ore to be sold by Moore & Crago would be mixed

by the buyer, another merchant-producer of ore, and resold at his own ceiling prices, so that the cost to the consumer of the ore would not be raised.

The firm sold only 30,000 tons of ore in 1941. Plans, however, had been made for an extension of operations and an increased output prior to the issuance of Maximum Price Regulation No. 113. The requested relief was granted in Order No. 1 under Maximum Price Regulation No. 113. The order becomes effective May 23.



Relief for Coal Users

••• An outline of the mechanics whereby receivers of bituminous coal in New York and New England can file applications for government absorption of increased transportation costs incident to the wartime dislocation of normal collier shipments, is contained in Compensatory Adjustment Regulation No. 1, issued May 19 by OPA. Applications must be filed with OPA and will contain full data.



Notarized Invoices Asked

••• In order to comply with the new requirements set up by OPA covering maximum price schedules, some large corporations are requiring notarized certifications to appear on all suppliers' invoices, both original and duplicate. The certification states:

"I certify that the prices on this invoice are in strict compliance with all provisions of the applicable maximum price schedules as established by OPA.

Name of firm
By
Title

"Sworn to and subscribed before me this day of 19...
..... Notary Public
My commission expires"



OPA Financial Reports

••• Studies of corporation financial reports being conducted by the OPA, as announced May 2, apply only to a selected list of corporations with assets in excess of \$250,000 in the manufacturing, mining, construction and wholesale fields, H. F. Taggart, director of OPA accounting division, said. Only those firms receiving the questionnaire—Form A, annual



AIRCRAFT plants—
other metal-working
shops—in fact, almost
everyone
handling *light*
manufacturing
operations—

**can use this No. 5-18"
GARDNER GRINDER!**

AT LEAST a dozen aircraft shops are using this small but sturdy Gardner Disc Grinder on the numerous light parts of steel, of cast iron, and of magnesium metal which they encounter so frequently. In some of these plants, from 2 to 6 machines are in operation.

That, of course, is only ONE field; almost every metal-working factory can profitably use this 18" Grinder for light manufacturing operations on the Erecting Floor, in the Tool Room, and even in the production line.

This economical tool is powered by a 3 H.P. built-in motor, operating at 1200 R.P.M.—the CORRECT speed for 18" abrasives.

It has a ball-bearing mounted spindle, full-size work tables, heavy-duty WIRE-LOK abrasive wheels guarded with welded-steel hoods—fully MODERN construction!

It will handle your small flat surface jobs quickly—accurately—economically!

Write for
Bulletin
202

**GARDNER - GRIND
YOUR Flat SURFACES**

GARDNER MACHINE COMPANY
412 East Gardner Street • • • Beloit, Wisconsin, U.S.A.

Revision Sheets for Price Guide Issued

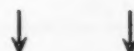
••• The Price Guide issued by this magazine (termed by an OPA official who relies upon it heavily as the most useful compilation of its kind ever issued) has been brought up to date by means of revision sheets. The Price Guide may be obtained from the Reader Service Department, THE IRON AGE, 100 East 42d Street, New York, for 25c. apiece, up to 10 copies; 11 to 100 copies, 20c.; 101 to 300 copies, 18c. In ordering four copies or less, please send stamps or coin.

financial report; and Form B, the interim financial report—are required to supply data. Retail businesses have not been asked to file except in a few cases where corporations combine wholesale and retail activities.



"Open End" Contracts

••• To promote spread of orders, speed in delivery and wider use of existing facilities, the WPB has issued Directive No. 3, providing for the renegotiation of government contracts of the "open-end" type used in peacetime. These contracts require a government agency to purchase all of its requirements of a specified article from one company over a definite period of time.



Handling Charges on Coal

••• Dock operators on the upper Great Lakes are permitted to add specific handling and storage charges to mine prices plus transportation charges in determining maximum prices for the sale of railroad fuel, as the result of Amendment No. 2 to Maximum Price Regulation No. 122. Any dock operator on the west bank of Lake Michigan or on the United States side of Lake Superior is allowed to add the actual handling charge the individual dock operator making the sale had in effect for sales of railroad fuel during the Dec. 15-31, 1941, period. However, the maximum charge allowed for handling is set at 55 cents per ton.

Sales by Export Agents

••• Agents or subsidiaries of American exporters selling to foreign consumers in Latin America or other foreign countries must abide by the ceiling prices established by OPA's Maximum Export Price Regulation under an amendment issued by Price Administrator Leon Henderson.

The amendment also makes several other changes in the regula-

tion as originally issued, including:

1. An alternative pricing base so that American exporters who buy for resale will not lose the benefit of a good bargain on merchandise acquired for sale abroad;
2. A deadline—July 1 next—for exception from the regulation of shipments made under general licenses against contracts entered into prior to April 30;
3. A more definitive method for manufacturers and producers to determine base export prices on goods not subject to domestic price control;
4. Requirement that any "drawback" of import duties or export subsidy be deducted from base export prices.



YOU HAVE TO CLEAN 'EM TO GET 'EM TO FLY

• In a big airplane engine there are more than 8000 separate pieces of metal, and many of the pieces have been machined to a tolerance of one ten-thousandth of an inch—the thirtieth part of a human hair.

Such tolerances set new standards of performance for metal cleaning and finishing.

For process cleaning of magnesium,

aluminum and steel parts of airplanes, Wyandotte has special degreasing compounds that are doing remarkable cleaning jobs.

Wyandotte Metal Cleaning Specialists are on the job night and day, helping airplane plants, arsenals, metal shops and factories to keep 'em flying, keep 'em rolling, keep 'em winning.



THE J. B. FORD SALES COMPANY • WYANDOTTE, MICHIGAN

THE IRON AGE, May 28, 1942—111

General Maximum Prices

• • • In connection with the General Maximum Price Regulation, it was pointed out by OPA last week that an actual delivery during the base price control month of March takes precedence over any higher retail offering price. Another ruling postponed the application of the general regulation to terms of War and Navy contracts until July 1. Still another clarification was made with the announcement that plans are developing to prevent prices paid abroad for imported goods from disturbing domestic price levels. At the same time it was emphasized that the general regulation applies to imported commodities sold in this country as well as domestic commodities.



Fuel Oil Storage Tank Prices

• • • Fuel oil storage tank Maximum Price Regulation No. 96, amendment No. 1, provides permissible additions to maximum prices when delivery is within the eastern area. These additions are: (1) Maximum allowance for each extra girth or transverse seam, 75c.; (2) Maximum allowance for each two extra longitudinal seams, 75c. Minor changes are made in the pricing schedule of the order.



Transportation Rulings

Closed Freight Cars

• • • Blanket restrictions on the use of closed freight cars in any kind of intra-terminal freight movement, recently imposed by an amendment to general order No. 1, have been modified to apply only to l.c.l. merchandise where such cargo can be handled by motor vehicle. The new amendment (No. 2) specifies that with certain exceptions, no carrier may load or forward between points in the same municipality, or between contiguous cities, or within adjacent zones, "any railway closed freight car containing merchandise."

The exceptions provide use: (1) where necessary to relieve freight house facilities because of inability to obtain transportation by motor vehicle; (2) where motor vehi-

New Priorities Guide To Be Ready June 4

• • • The sixth edition of the Priorities Guide, issued at intervals by THE IRON AGE for the use of industrial and government offices dealing with wartime controls of materials and machinery, will be published next week.

The June issue of the Guide, prepared by THE IRON AGE staff, will include listing of all metal industry priority regulations and forms, information on extensions and appeals, a directory of war agencies and other information needed by industry in wartime.

Prices for additional copies of the Guide are: one to 10 copies, 50c. each; 11 to 100 copies, 40c. each; 101 to 300 copies, 35c. each, and 300 or more copies, 30c. each. Wire or mail your order to THE IRON AGE, 100 East 42nd Street, New York. Kindly send stamps or coin with orders amounting to \$2 or less.

cles are not available; (3) where facilities make motor transport impracticable and then only if such car contains the net tonnage demanded by general order No. 1; and (4) where authorized by special or general permit by ODT. The new amendment also provides for records and reports of all cars loaded under the exceptions, and the net tons carried.



Tank Car Shipments

• • • A special or general permit will not be needed to move any commodity by tank car to a destination more than 100 miles away as measured by the shortest available published rail tariff route, according to amendment No. 1 to Exception order ODT No. 7-1. Such commodities need not be actually shipped by the shortest route if another is considered by the shipper to be more feasible. The shortest route is to be used as a yardstick for determining whether or not a special or general permit is required, it was explained.

General order ODT No. 7 with its Exception Order ODT No. 7-1, establishing a Section of Tank Car Service and setting up the framework for a nationwide system of tank car control, goes into effect June 1. Also exempt from the per-

mit requirements of the order are shipments of petroleum and petroleum products into 17 Eastern States and the District of Columbia from any other state, and into the states of Washington and Oregon from any outside point. Shipments of less than 100 miles within these areas are not exempt.



Freight Survey

• • • A nation-wide check on all carload freight billed and forwarded from each station on the nation's railroads on a given date was announced last week by the Office of Defense Transportation. Complete copies of all waybills on all carload freight originating on their lines on May 27 was asked of each railroad. From this study, ODT is expected to be better able to effect continuous adjustments between the requirements and available services of the nation's transportation facilities.

The check will be of help to the WPB in certifying priorities, if necessary, in the transportation of materials, articles, fuel, and other commodities among military, economic defense, defense aid, and civilian defense demands. In addition, from the information available from each waybill, ODT will be able to determine the volume, origin, flow, and destination of principle articles moving in commerce, and the extent of freight commodity cross-hauls and circuitous hauls.

23,000,000 Tons of Merchant Vessels Awarded

• • • Contracts for the 23,000,000 dead-weight tons of merchant ships which the President has set for the 1942-43 wartime goal of the United States have now been awarded, the Maritime Commission reports.

The contracts call for delivery into service of nearly 2300 ships, either cargo vessels or tankers, before the end of the 2-year period—the greatest merchant ship-building program in world history. This program does not include more than 700 other craft under Maritime Commission order, such as tugs, wooden barges, and small power boats, for which no tonnage is figured.

WPB Injunction Against J & L Refused: Others to Be Called

Pittsburgh

••• The government early this week failed to obtain a temporary injunction against Jones & Laughlin Steel Corp., for alleged violation of steel priority rules. Federal Judge F. P. Schoonmaker withheld action on the Government's request and set June 15 for a trial to cover all issues in the Government's complaint. In directing that the case against J. & L. begin in Pittsburgh on June 15, Judge Schoonmaker also directed that Jones & Laughlin submit its answer to the Government's complaint on June 11.

In a surprise move last week, the Government had asked for a temporary injunction after the court had previously granted an extension of time for Jones & Laughlin to file its answer to the original complaint.

Jones & Laughlin's counsel, former Judge Elder W. Marshall, appearing in court ready for an oral answer to the Government's request for a temporary restraining order, declared the Government suit was an unwarranted attack upon the patriotism of the company, adding that "at the very time this suit was filed Jones & Laughlin was being commended by the Navy for its production record."

Charging confusion in the War Production Board, the counsel for Jones & Laughlin said: "There may have been misinterpretation of (WPB) orders because of confusion in the War Production Board, but the latter has always had the right to order Jones & Laughlin to do what it wanted done. Never has there been a time when the WPB could not have said, 'do this and do nothing else until it is done'."

Marshall stated that in the first 16 days of May, Jones & Laughlin shipped 98.3 per cent of its products on orders bearing ratings of A-1 or higher, and not a single ton of non-rated material has been shipped during the current month. In April, out of a total of about a quarter of a million tons of steel, only 51 tons went out on non-rated orders and this involved discards, rejects, etc. He added that for

the past six weeks, the company has been operating almost 100 per cent on high priority business and at present is turning out steel at 102 to 103 per cent of its rated capacity as compared with 98 per cent for the industry as a whole.

John Lord O'Brien, general-counsel for the WPB, said that the Government's suit involved no question of patriotism, good faith, bad faith, or motive, and said that the action was taken to speed up production of war material, and to make sure that companies complied with WPB orders. In arguing for the sanction of a court order to support WPB's regulations, O'Brien said that the suit was not an attack on "anyone's patriotism" and stated that several other steel companies had been or would be cited for priority violations by the Government.

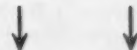
The J. & L. counsel told the court that the company's employees had demanded that J. & L. go to Washington to tell how much war work was actually being done by the company.

be sent in on or before June 5. Manufacturers, assemblers, wholesalers, distributors or retailers must file if stocks, regardless of ownership, amount to: (1) 25 or more complete fixtures including ballasts and starters, or (2) 100 or more separate ballasts, or (3) 500 or more separate replaceable starters. Inventories may be combined on the report for forms having stocks in more than one location, but locations covered should be listed separately.



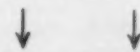
Defense Construction

••• Only material physically incorporated into defense construction projects may be delivered under preference ratings assigned by order P-19-a, WPB ruled, in amendment No. 1 to the order. Originally, P-19-a assigned ratings to material entering indirectly into the construction of such projects. Later the P-19-a series was supplanted by P-19-h, which limited assignment of ratings to material physically incorporated in the project. There remained, however, a number of serial numbers of P-19-a which have some months to run, and this amendment restricts rating application of these orders. It further revokes ratings assigned to material not to be physically incorporated in the project if the material has not yet been delivered to the builder.



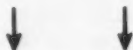
Chlorine Deliveries

••• Chlorine users may accept delivery in the smallest practical delivery unit and the date for filing orders with producers is advanced to the 10th of the preceding month by an amendment, effective May 1, to order M-19. Form PD-190 shall be filed with the producer by the user on or before the 10th of the preceding month in which delivery is sought.



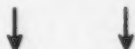
Plumbing Equipment

••• Limitation order, L-79, which freezes sale and shipment of most types of plumbing and heating equipment, is not intended to limit the use of the equipment covered as security for a loan. Interpretation No. 1 of the order permits the



Toluene

••• To provide an additional 200,000 gal. of toluene per month, producers are instructed in amendment No. 2 to order M-34 to operate equipment and facilities so that the maximum amount of toluene capable of being produced with such equipment and facilities shall be produced. The amendment applies to producers who recover toluene as a by-product of coke production and to those who process oils containing toluene.



Fluorescent Lighting

••• To determine existing stocks of fluorescent lighting fixtures and parts, WPB requested all producers and distributors to provide complete information on their June 2 inventories on form PD-499. The form, which may be reproduced in the same size and style as the official blanks, must

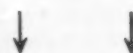
transfer of title where new plumbing and heating equipment is used as collateral in a security transaction, and if there is no physical movement except for purposes of storage or warehousing.



Construction Survey

• • • A nation-wide survey of all construction started since April 9, the effective date of conservation order L-41, has been inaugurated by WPB. Home Owners' Loan Corp. examiners are checking on observance of the order, and the reports of the 3000 examiners will be reviewed to determine action necessary in cases of violation of priorities procedures or provisions of L-41. This check is in addition to the compliance survey of the transactions of builders engaged in construction of privately-financed war housing projects, currently being made by 200 Department of Labor inspectors.

Other compliance surveys announced by WPB include operations of silverware manufacturers and inventories and uses of jewel bearings. These investigations will be carried out for WPB by FTC attorney-examiners.



Steel Producers' Forms

• • • The dates originally specified for filing forms PD-138 and PD-139, required from all producers of iron and steel products covered by general preference order M-21, have been postponed. Form PD-139, covering unfilled orders for the months of June and July, must be filed not later than June 10, and form PD-138, covering shipments for the month of June, must be filed not later than July 15.



Non-Metal Containers

• • • To speed manufacture of non-metal containers that will be used for food products, a rating of A-1-c has been assigned deliveries of ferrous material to be used in such containers by amendment No. 1 to order P-79. Manufacturers formerly had an A-7 rating, which was too low to obtain necessary nails and wire. The amendment sets up a procedure for application

of the higher preference rating to deliveries of ferrous material to which preference ratings have already been assigned under P-79 by notification to suppliers.



Quartz Crystal Allocation

• • • Allocation control over products employing the use of quartz crystals was ordered by WPB in order M-146. The order provides that, except by specific authorization, quartz crystals may be used only for specified products. Holders of 25 lb. or more of quartz crystals or 10 pieces in a manufactured form not incorporated in a mounting, as of May 18, must report same to WPB by June 20 on form PD-484. Consumers must also report monthly on PD-484 by the 20th of each month. Sales of more than 10 lb. must be reported within 10 days after the transaction on form PD-485, and this form is required for imports within 10 days after importation.



Fire Extinguishers

• • • WPB amended the fire protective equipment order, L-39, to permit the manufacture of carbon dioxide extinguishers in accordance with established specifications of the armed services and the Maritime Commission. Provision is also made by the amendment to permit brass fire hose couplings to be manufactured for and sold to the Maritime Commission. A similar exemption had already been provided for requirements of the Navy.



"Open-End" Contracts

• • • To promote spread of orders, speed in delivery, and wider use of existing facilities, the WPB has issued Directive No. 3, providing for the renegotiation of government contracts of the "open-end" type used in peacetime. These contracts require a government agency to purchase all of its requirements of a specified article from one company over a definite period of time.

In some cases, wartime needs for articles which the government has agreed to purchase from one company under "open-end" con-

tract far exceed the amounts contemplated when the contracts were originally signed, and participation of other companies is desirable both to obtain faster delivery and to use facilities of smaller companies that might otherwise go unused.

Most of these contracts have been entered into by Treasury Procurement. Contracts of the War Dept., Navy Dept., Maritime Commission, or any government corporation are excluded from the terms of the directive.



Lawn Mowers

• • • Liberalizing order L-67, WPB on May 22 authorized manufacturers of lawn mowers to produce until June 30 at the full rate of their 1941 output, provided that in the extra production they use only fabricated iron or steel in their possession prior to March 31. Previously, lawn mower manufacturers were restricted to 50 per cent of their rate of production in 1941. The amended order provides that a manufacturer's use of fabricated iron or steel in the excess of the amount fixed in L-67 must not increase his total use of iron and steel by more than an additional 50 per cent.



Tantalum Allocation

• • • Tantalum was placed under complete allocation by WPB on May 22. The order, M-156, provides that every person who wants tantalum must file by the 20th of each month, a report on form PD-488 and an application on form PD-487. To receive an allocation for June, users must file their reports by June 1. Processors of tantalum ore must report by June 27, and the 27th of each succeeding month, on form PD-489.



Chemical Plant Repairs

• • • Chemical manufacturers were given permission to use an A-1-c rating for 30 per cent, and an A-3 rating for the remaining 70 per cent of required maintenance and repair materials by an amendment to order P-89. An A-1-a rating remains available for emer-

gency supplies in case of breakdown, and the A-1-c rating is for supplies to avert a threatened breakdown. The amendment also allows an A-1-c rating to be extended by suppliers to replenish their stocks. No use of the ratings may be made by anyone unless the producer has a serial number, obtained from the WPB Chemicals Branch.



Machine Tool Exports

• • • Procedure to be followed in placing of orders for machine tools allocated to foreign countries was formalized in a directive issued on May 20. Under the provisions of general preference order E-1-b, each producer's monthly deliveries by sizes and types is apportioned, 75 per cent to the Army, Navy and Maritime Commission and 25 per cent to be divided among foreign purchasers and essential industries in the United States and Canada as scheduled for delivery in accordance with preference ratings.

Tool orders for foreign purchasers are given a blanket A-1-a preference rating and no preference rating certificates are required. The percentage allocated to foreign purchasers as a group is determined by the Machine Tools Subcommittee of the WPB Requirements Committee. Within these allocated quantities the Office of Lend-Lease Administration will make recommendations to the subcommittee with respect to the apportionment of machine tools among various foreign countries. Upon approval of such recommendations by the subcommittee, the purchase orders will be placed by the Army Ordnance Department.



Steel Products

• • • Fabricators of the 400-odd iron and steel products listed in steel conservation order M-126 were reminded last Thursday by the WPB that May 20 was the last day that they could accept delivery of raw material going into those items. Until June 19, they may continue fabrication of the products listed in the order, and for the next 45 days thereafter fabricated parts may be assembled. After Aug. 4 all manufac-

ture and assembling of the products listed in the order must cease. The only exceptions to the cessation rule will be by specific authorization. Manufacturers may apply on form PD-437, which is obtainable from the WPB field office nearest the factory making the appeal and must be returned to that office.



Utility Installations

• • • Plans for using materials in excess stocks of utilities will be used in making electrical extensions to housing projects, according to WPB. No authority will henceforth be granted for purchase of such material in the open market for use in extensions to housing projects; all such material must come from excess stocks now on hand. As part of this plan, the WPB has received from electric utilities reports on excess stocks of wire and other materials. It is now preparing a catalogue of such stocks which will be furnished to all electric utilities. When a utility wishes to make an extension of more than 250 ft. it must make application to the WPB, and if approved the utility will be authorized to use from its own stock or to acquire from another utility sufficient material for the installation. To reduce the quantity of critical materials used in making electric, gas, and water extensions to housing projects, WPB has reduced the allowable weights of materials and distances for such extensions. The new standards apply to houses on which construction began after April 22.



M-126 Interpretation

• • • To eliminate overlapping provisions restricting production of beds, WPB has announced an official interpretation of the iron and steel conservation order, M-126, as it affects beds and bed springs and general limitation order L-49, relating to springs and mattresses.

In Lists A and B of M-126, "Beds—except hospital," means bunks, berths, metal folding cots, roll-away cots, sanitary couches, and day beds. Order L-49 covers and limits, by types of manufacture

and by periods, the amount of iron and steel which may be used in coil, flat, box and fabric bed springs, innerspring mattresses and pads, studio couches, sofa beds, and lounges designed for dual sleeping and seating purposes and other spring and mattress items.



Steel Drums

• • • To relieve a shortage of steel drums for export shipment on the east and west coasts, reserve allotments of steel sheets for this purpose are expanded to include both hot and cold rolled sheets by an amendment to order M-45. The original order directed producers of hot rolled steel sheets to set aside tonnage as ordered by WPB for the specific purpose of drum manufacture. This amendment broadens the order to include cold rolled sheets as well.



Power Equipment

• • • Heavy power and steam equipment for marine use is not restricted by order L-117 covering the manufacture of this equipment. Only the equipment produced for other than marine use is covered by the order.



Industrial Lighting

• • • Redefined to make it clear that the order does not cover industrial lights, WPB announced amendment No. 2 to Order L-33, which applies to portable lamps illuminated either by incandescent or by fluorescent bulbs or tubes. The order excludes industrial lamps, used in conjunction with industrial machines, tools, assembly benches, and similar factory equipment; and any overhead suspended fixtures, either portable or non-portable.

The amendment also adds auxiliary ballasts and starter switches to the essential parts in which iron and steel and other metals may be used in the manufacture of lamps. These parts are added to allow the use of metal in parts essential to lamps using fluorescent tubes as well as in parts essential to lamps using incandescent bulbs.

This Week's Priorities and Prices

- Bolts, Nuts, Screws, and Rivets** were placed under manufacturers' ceiling prices by price regulation 147, effective May 28. (OPA-PM 3364)
- Ethyl alcohol** revised price schedule 28 was amended (No. 1), effective May 23, revoking the sliding scale method of pricing ethyl alcohol produced from certain products. (OPA-PM 3365)
- Two gas heating stove** prices, proposed by Samuel Stamping and Enamelling Co., Chattanooga, Tenn., were approved by order 2 of revised price schedule 64, effective May 23. (OPA-PM 3366)
- Construction survey**, nationwide, started April 9, the effective date of order L-41. (WPB-1173)
- Distributors, jobbers, and wholesalers** should not make application for priority assistance on form PD-1-a, regardless of whether scarce materials are covered by order L-63, according to a correction issued May 20. (WPB-1181)
- Machine tool directive**, No. 4, issued May 14, formalizes the procedure to be followed in placing orders for allocations to foreign countries. (WPB-T 331)
- Arms sales** to the government are excluded from the general maximum price regulation by supplementary regulation No. 4, effective May 18. (OPA-PM 3348)
- Jones & Laughlin Steel Corp.** and Allegheny Ludlum Steel Co., with three scrap brokers, were enjoined by a temporary restraining order from buying and selling scrap over the legal ceilings, May 19. (OPA-PM 3356)
- Scrap dealers'** forms for registration of all dealers selling to consumers, and in the case of iron and steel scrap, to consumers or their brokers, are now being printed. (OPA-PM 3359)
- Brass screws** or other copper products used to attach handles to blades of saws is declared illegal by interpretation 3 to order M-9-c as amended, effective May 19. (WPB-1171)
- Utilities' excess stocks** of materials will be used in making electric extensions to housing projects. (WPB-1172)
- Machinery distribution order** L-83 as amended, effective May 18, includes three new groups of machinery: dairy, coffee grinding, and food slicing and grinding, whose distribution is regulated. (WPB-1159)
- Heavy power and steam equipment** manufacture, delivery, and sale is restricted by order L-117, effective May 18. (WPB-1162)
- Mechanical rubber goods** price ceiling 149, effective May 27, establishes ceilings on manufacturers' prices for standard items and outlines formula for computing prices on specially designed items. (OPA-PM3412)
- Gray iron casting producers** are given, by order 1 effective May 25, under section 1499.3(b) of the general maximum price regulation, a formula for determining the ceiling for any casting not covered under section 1499.2. (OPA-PM3421)
- Moore and Crago**, Duluth, Minn., iron ore producers, are granted relief from ceiling prices under regulation 113 by order 1, effective May 23. (OPA PM3422)
- Steel scrap stockpiling** aided during summer months by amendment No. 1 to order M 24, issued May 23, and by removal of restrictions of priorities regulation No. 1. (WPB 1193)
- Safety razors** were frozen in hands of manufacturers and jobbers by order L-72-a, effective May 23, WPB 1198)
- Amusement construction** costing \$5000 or more ordered halted by order L-41-a, before June 6. (WPB-1204)
- Plumbing and heating equipment** restrictions under order L-79 as amended, were relaxed by removing ban on equipment essential for civilian needs, effective May 23. (WPB-1205)
- Defense construction project material** must be physically incorporated into project for delivery under ratings assigned by order P-19-a, according to amendment No. 1, issued May 23. (WPB-T345)
- Shoe findings** containing copper may be used if in stock on March 31 and if no steel or non-metallic findings are available, under an amendment to order M-9-c-1, effective May 23. (WPB-T346)
- Mica use** in products for Army and Navy is placed under complete control of WPB by amended order M-101, effective June 1. (WPB-T349)
- Canned goods** boxes other than those specified in amendment No. 1 to order M-86-a will not be allowed for this year's pack of canned fruits and vegetables. (WPB-T350)
- Iron and Steel order** M-126, interpretation 1, shows how the order affects beds and bed springs, and order L-49, relating to springs and mattresses, was issued May 23. (WPB-T351)
- Export ceilings** established by the maximum export price regulation, under amendment 1, effective May 25, cover sales to foreign consumers. (OPA-PM-3389)
- Arsenic** is put under allocation by order M-152, effective May 22. (WPB-1188)
- Chemical war industries** granted further priority assistance for maintenance and repair materials by amendment 1 to order P-89 as amended, effective May 22. (WPB-1189)
- Increased lawn mower** production permitted by amendment 1 to order L-67 until June 30. (WPB-1190)
- Commercial oil imports** control taken on all such oils not under previous control, by amendment No. 6 to order M-63, effective May 22. (WPB-1192)
- Toluene order** M-34 amended (No. 1), May 22, to provide additional 200,000 gal. for war uses. (WPB-1197)
- Plumbing and heating order** L-79, freezing sales and shipments, is not intended to limit use of the equipment covered as security for a loan, according to interpretation No. 1, issued May 22. (WPB-T334)
- Rhodium use** in silver deposit glassware banned by Order M-95, according to interpretation 1. (WPB-T339)
- Tantalum** is placed under full allocation control by order M-156, May 22. (WPB-T341)
- Chlorine deliveries** restrictions altered by correction to order M-19, as amended, May 22. (WPB-T344)
- Fluorescent lighting fixtures** and parts inventories to be reported to WPB by producers and distributors on form PD-499, for June 2 stocks. (WPB-T347)
- Two steel companies** that were previously permitted higher than ceiling prices on some products were ordered to reduce prices by orders 9 and 10, to revised price schedule 6, effective May 23. (OPA-PM3385)
- Vacuum cleaner** price regulation 111 amendment (No. 3) slightly as of May 23. (OPA-PM3388)
- Petroleum industry** supplies exports, controlled by the Foreign Petroleum Material Rating Plan, were clarified as to jurisdiction of orders by amendments Nos. 4 to order M-68 and 1 to order M-68-c as amended, May 21. (WPB-1184)
- Carbon dioxide fire extinguishers** order L-39, amendment No. 3, issued May 21, may be made according to established specifications of armed services and Maritime Commission. (WPB-T330)
- Domestic fuel oil** storage tanks manufacturers using sheet metal materials of a size requiring extra lengthwise seams are granted an allowance for increased costs by amendment No. 1 to revised price schedule 96, effective May 25. (OPA-T335)
- Radio, phonograph** price schedules 83 and 84, amendments 3, effective May 21, redefines term "manufacturer" so that factory branches performing functions of wholesalers and distributors are no longer covered by orders. (OPA-T337)

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For copies of above announcements address Division of Information, WPB (or OPA), Washington, giving announcement number as shown in parentheses after each paragraph. (For example, WPB-600 means announcement 600 issued by the War Production Board.)

Revisions for The Iron Age Priorities Guide

• • • The following data, together with all intermediate weekly revisions in THE IRON AGE, should be added to THE IRON AGE Priorities Guide published with the issue of March 26 to bring the Guide up to date:

Under "P Orders", page 5, add:

P-79...Amendment No. 1, effective May 16, provides high ratings for ferrous materials to manufacturers of non-metal containers for food products.

P-19-a...Amendment No. 1 restricts rated material to that which will be physically incorporated into defense construction projects. (5-23-42)

P-46...Informal interpretation restricting electric utilities to use of materials in excess stocks in making electric extensions to housing projects. (5-19-42)

P-79...Amendment No. 1 assigns A-1-c ratings for deliveries of ferrous materials to non-metal food container manufacturers. (5-18-42)

P-89...Amendment No. 1 grants chemical plants A-1-c and A-3 ratings for repair, maintenance, and operating supplies. Expires June 30, 1942. (5-22-42)

Under "M Orders", page 9, add:

M-21-e...Bans use of tin and terne plate except for specified products. (5-18-42)

M-40...Amendment No. 1 places sperm oil under complete allocation. Related forms: PD-481, an application for material; and PD-482, an inventory to be filed by June 15. (5-16-42)

M-72...Revisions governing tin and lead scrap, requiring dealers to file PF-249 and consumers to file form PD-254, and permitting WPB direction of shipment of scrap or materials produced from scrap. (5-18-42)

M-9-c...Interpretation No. 3 prohibits use of brass screws or other copper products to attach saw blade handles. (5-19-42)

M-9-c-1...Permits shoe manufacturers to use findings containing copper if such findings were in stock on March 31, and if no steel or other non-metallic findings are available by amendment to order. (5-23-42)

M-19...Correction to amended order permits users to accept certain chlorine deliveries and advances date of filing orders. Related form: PD-190. (5-22-42)

M-34...Amendment No. 2 forbids sale, use, or delivery of any oil containing toluene until maximum amount of toluene is extracted and other provisions. (5-22-42)

M-63...Amendment No. 6 to general imports order controls imports of all known commercial oils not previously restricted. (5-22-42)

M-68 and M-68-c...Amendments 4 (to M-68) and 1 (to M-68-c) makes it clear their provisions apply only in the United States, territories and possessions, and Canada. (5-21-42)

M-115...Amendment 1 requires sale of collapsible tin tubes to Tin Salvage Institute. (5-20-42)

M-126...Interpretation No. 1 clarifies overlapping of order M-126 and L-49 in regard to beds, bed springs and mattresses. (5-23-42)

M-146...Complete control of quartz crystals. Related forms: PD-484 (inventories to be in by 20th of month) and PD-485 (sales and imports to be in within 10 days after transaction). (5-18-42)

M-156...Complete allocation control of tantalum. Related forms: PD-487 (application for material), PD-488 (report of requirements by 20th of preceding month), and PD-489 (report of use of tantalum ores or concentrates to be in by 27th of month). (5-22-42)

Under "L Orders", page 12, add:

L-26...Amendment No. 3 eases restrictions on export of farm machinery and equipment. PD-388 to be filed showing 1940, 1941, and 1942 exports, and PD-387 to be filed to show subsequent monthly shipments. (5-18-42)

L-41-600...Authority to begin construction of government roads without individual project authorization. Form PR-46 of Public Roads Administration covers scope and demand for materials of program.

L-42...Amendments No. 1 to Schedule I and No. 2 to Schedule II remove restrictions on manufacture of plumbing fittings and valves for Navy and Maritime Commission vessels. (5-16-42)

L-54-b...Amendment No. 2 modifies restrictions on distribution of new office machinery to permit return of equipment to manufacturers willing to accept it. (5-8-42)

L-59...Amendment No. 1 removes permission to produce metal plastering bases and accessories for direct war contracts in addition to quotas. (5-16-42)

L-63...Exemption No. 4 removes from restrictions of suppliers' inventory limitation order L-63 stocks of supplies made of aluminum in hands of wholesalers and distributors. (5-4-42)

L-80...Permits sale or lease by manufacturers of motors of 6 hp. or more to specified government agencies. (5-2-42)

L-81...Interpretation No. 1 clarifies meaning of "raw material form" in relation to toy manufacturers. (5-8-42)

L-82...Restricts sale and production of power cranes and shovels. Related forms: PD-446 and PD-448. (5-2-42)

L-82-a...Assumes rigid control over production and distribution of all types of rubber tired construction equipment. Related forms: PD-446 and PD-448. (5-4-42)

L-88...Amendment 1 relaxes control over shipments up to 10 tons of used relay rail and removes High Tee rail from terms of original order. (5-18-42)

L-93...Amendment No. 2 permits golf club manufacturers to use complete fabricated plastic ferrule and caps they now have on hand. (5-12-42)

L-94...Requires integrating of power systems and establishes machinery for mandatory curtailment of commercial, industrial, and residential power. Related form: PD-424. (5-1-42)

L-103...Restricts design and amount of glass used in containers to help meet tin can and other metal container shortage. (5-11-42)

L-106...Prohibits use of copper or copper base alloys in manufacture of a specified list of essential parts for motor vehicles. (5-6-42)

L-110...Restricts manufacture, delivery, and sale of electroplating and anodizing equipment to A-1-j ratings or higher. Ratings must be assigned on form PD-1-a and dated after effective date of order. (5-11-42)

L-113...Prohibits use of any metal except limited quantities of iron or steel in manufacture of pencils. Related form: PD-423. (5-2-42)

L-114...Regulates use of aluminum, copper, plastics, and other materials in manufacture of safety equipment. (5-5-42)

L-115...Prohibits manufacture of incendiary bombs for demonstration purposes to conserve aluminum and magnesium. Related form: PD-449 (5-7-42)

L-117...Restricts manufacture, delivery and sale of heavy power and steam equipment to only approved orders. Approval of order may be on forms PD-3-a, PD-3, PD-1 and PD-1-a. (5-18-42)

L-26...Letter interpreting order on grain bin manufacture not to include those made of wood that contain no metal except nails, strapping, and hardware. (5-23-42)

L-39...Amendment No. 3 permits manufacture of carbon dioxide fire extinguishers to certain specifications and sold to A-1-j rated orders or higher. (5-21-42)

L-41-a...Supplementary order curtails all construction for amusement of public with certain exceptions costing \$5,000 or more. (5-23-42)

L-58...Interpretation No. 1 defines "sextants" as used in order to mean only mariner's sextants. (5-22-42)

L-63...Correction to read "distributors, wholesalers, and jobbers should not make any application for priority assistance on form PD-1-a, etc." No priority applications should be made and none will be granted for items listed in interpretation No. 1. (5-20-42)

L-67...Amendment No. 1 permits limited output of lawn mowers until June 30 under certain conditions. (5-22-42)

L-72-a...Supplementary order freezes sale and delivery of safety razors in hands of manufacturers and jobbers. (5-23-42)

L-78...Survey of producers and distributors supplies as of June 2 of fluorescent lighting fixtures and parts, to be filed on form PD-499. (5-22-42)

L-79...Interpretation No. 1 permits transfer of title where new plumbing and heating equipment is used as collateral in a security transaction and if there is no physical movement except for purposes of storage. (5-22-42)

L-83...General revision of order regulates distribution of many types of industrial machinery including dairy, coffee grinding, and food slicing and grinding machinery. Related forms: PD-1-a, PD-1, PD-3, PD-3-a, PD-200, and PD-200-a. (5-18-42)

"Directives," a new classification, on page 14.

No. 3...Renegotiation of "open-end contracts" by all government agencies. (5-14-42)

No. 4...Formalizes procedure to be followed in placing orders for machine tools specified to foreign countries through Machine Tools Subcommittee of WPB Requirements Committee. (5-14-42)

L-33...Amendment No. 2 redefines portable lamps and adds to the list of essential lamp parts in which metals may be used. (5-25-42)

Under "Priorities Regulations", page 14, add:

No. 1...Amendment No. 2 adds specified countries whose government orders are defined as "defense" orders under regulation terms. (5-1-42)

No. 8...Amendment No. 2 removes orders P-19, P-19-a, P-19-e, and P-19-h, in connection with which certain reports on PD forms have been required, from Appendix B of the regulation. (5-2-42)

PERSONALS

• **R. C. Onan**, of the Lindberg Engineering Co., Chicago, has been appointed district sales manager for the company's newly opened offices in northern Illinois, Iowa, Wisconsin and Minnesota territory.

• **A. F. Allen**, one of the veteran executives in the steel industry, is retiring as secretary-treasurer of the American Steel & Wire Co. With over 52 years of service with subsidiary companies of the United States Steel Corp., Mr. Allen's association with the wire company dates back to the year of the formation of that company. In 1890, Mr. Allen joined the Illinois Steel Co., which was later to become a subsidiary of U. S. Steel Corp. His services with Illinois Steel were in Chicago in the purchasing, treasurer's and secretary's office. He became associated with the American Steel & Wire Co., which also was later to become a U. S. Steel subsidiary, in 1899. He started as a clerk in the secretary's office and in 1900 became assistant treasurer and the following year also assistant secretary. In 1901, he was elected secretary and in 1928, treasurer.

• **E. G. Haven** has been appointed sales manager of the aviation division of General Electric's industrial department and **David R. Shoults** has been named engineer of the same division. Mr. Haven entered the employ of the General Electric Co. as a student engineer in 1922. In 1923 he joined the Adirondack Power & Light Co., returning to General Electric in 1929 as a member of the company's marine and aircraft engineering department. In 1932 Mr. Haven transferred to the industrial engineering department, and in 1936 joined the aviation division where his work has covered engineering and sales activities of this division. Mr. Shoults joined General Electric as a student engineer, and worked in several G-E plants. He has been with G-E's industrial engineering department since 1928. For several months in 1941, Mr. Shoults was in England doing special war work.

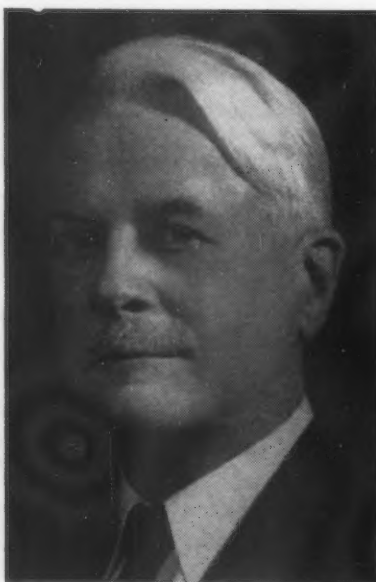
• **Henrik Ovesen**, until recently chief engineer for the Division of Contract Distribution of OPM, has joined Lukens Steel Co., Coates-



R. C. Onan, district sales manager, Lindberg Engineering Co., Chicago.

ville, Pa., as consulting engineer. In 1925, Mr. Ovesen joined Youngstown Sheet & Tube Co. as chief engineer with which he was connected until 1935 when he engaged in consulting engineering work. He has supervised construction of several steel mills both in this country and England.

• **William C. Johnson**, sales manager of the crushing and cement division, has been named manager of the general sales organization



A. F. Allen, who is retiring as secretary-treasurer of the American Steel & Wire Co., Cleveland.

of the Allis-Chalmers Mfg. Co., Milwaukee.

• **F. B. Davis** has been named sales manager of Aristoloy alloy steels and Coppco tool steels in the Buffalo district of the Copperweld Steel Co., Warren, Ohio. Mr. Davis was previously connected with the Edgar T. Ward Co.

• **Harry H. Heckroth** has resigned from the Barber Asphalt Corp. to become associated with the Penn Supply & Metal Corp., Philadelphia, as vice-president. Previous to his association with Barber Asphalt, Mr. Heckroth was a member of the board of directors and sales manager of Keasbey & Mattison Co.

• **H. Sturgis Potter**, of the Indianapolis branch of the Carpenter Steel Co., has been transferred to the main office at Reading, Pa., with the title assistant manager of tool steel sales.

• **Crispin Oglebay**, president of Oglebay, Norton & Co., Cleveland mining and lake shipping firm, has received the honorary degree of Doctor of Laws at the University of West Virginia in Morgantown for "meritorious and distinguished service in business and philanthropy." The presentation was made at commencement exercises and marked the second time his native state has so honored him, a similar degree having been awarded him a year ago by Bethany College.

• **J. G. Shryock** has received an honorary degree of Doctor of Science in Engineering from the Pennsylvania Military College, Chester, Pa., on May 19. Mr. Shryock is president and chief engineer of the Belmont Iron Works, Philadelphia.

• **Harold A. Knight** has been appointed associate editor of *Metals and Alloys*, metal-industries engineering magazine. Mr. Knight has a long and intensive record of editorial achievement in the metal industries field, having been at different times on the editorial staff of *THE IRON AGE*, metals editor for the *New York Journal of Commerce* and associate editor of *Steel*.

• **George Kentis, Jr.**, has been promoted to the post of chief engineer of the Yoder Co., Cleveland. Mr. Kentis advanced to the position of chief engineer from superintendent of the boring mill division, which position he held since the early part of the war effort.



R. W. Helms, general manager of sales, Berger Mfg. Division, Republic Steel Corp., Canton, Ohio.

• R. W. Helms has been appointed general manager of sales of the Berger Mfg. Division of Republic Steel Corp., at Canton, Ohio, succeeding J. W. Strong, who died recently. Mr. Helms began his business career as a cost clerk with the Dallas branch of Berger. In 1929, after five years as department manager and three years as branch manager at Dallas, he was transferred to Canton, Ohio, where he joined the general sales staff. In 1935 he was made assistant general sales manager.



George Kentis, Jr., chief engineer Yoder Co., Cleveland.

• William M. Denny has been named manager of the contract service department of General Electric. He succeeds Frederick P. Wilson, who has retired after 51 years' service with the company.

• Richard C. Gazley, formerly of the aircraft division of Murray Corp. of America, Detroit, has joined Fairchild Engine & Aircraft Co., Hagerstown, Md.

• Clyde R. Paton, recently resigned as chief engineer of the Packard Motor Car Co., has joined the engineering staff of the Allison Division of General Motors Corp. at Indianapolis.

• C. S. Stutz, who until May 1 was traffic manager of Chevrolet Gear & Axle division of General Motors Corp., has been put in charge of the Detroit Branch Office of the Traffic Control Division, Services of Supply, Office of the Chief of Transport, War Department.

• Allan S. Lehman, a partner of Lehman Brothers since 1908, has been elected a director of the Studebaker Corp.

• Page A. Mead, formerly with the Johns Conveyor Division of the Osborn Mfg. Co., Cleveland, has been named to the company's expanded brush engineering field service staff and will be located in Delmar, N. Y. Others appointed to the service staff are Paul A. Malling, formerly serving the western New York territory, who will cover New Jersey and will be located in Fairlawn; William F. Short, formerly with the Reeves Mfg. Co. of Dover, Ohio, who will be located in Hamburg, N. Y., and will serve Buffalo and western New York state, and Max Sherwood, formerly with the Johns Conveyor Division of Osborn, Gilbert B. Pecsok, formerly of the Cleveland office and Ralph B. Jones, formerly sales-service manager, who will work out of the company's Chicago, New York and Cleveland offices respectively.

• Sydney Hogerton and Phillip M. McCullough, have been appointed deputy regional directors of WPB for New York and northern New Jersey. At the same time H. Dudley Swim has been named priorities district manager, succeeding Mr. Hogerton.

• Louis R. Popp, vice-president of Pierce Renewable Fuses, Inc., Buffalo, has been appointed a member of the electric fuse industry advisory committee of the WPB.

OBITUARY . . .

• Howard K. Rigdon, for over 10 years Cleveland district manager of Hiram Swank's Sons of Johnstown, Pa., died May 10. He was formerly superintendent of Republic Steel Corp.'s open hearth and mills at Warren, Ohio, and prior to that had held similar position at Harrisburg Steel Corp. and had been assistant open hearth superintendent for McKinney Steel Co., Cleveland.

• Harry F. Ellis, for the past 24 years vice-president of the White Tool & Supply Co., Cleveland, died of a heart ailment May 21. He was 64 years old.

• Charles S. Smith, former vice-president in charge of sales of National Refining Co., Cleveland, died at his home in Detroit, May 20, aged 56 years. His entire business career was with National Refining having started as office boy in 1905. In 1908 he was made a salesman and in 1911 became manager of the bulk plant in Columbus. In 1915 he returned to Cleveland as manager of the Ohio division and five years later became secretary. He served as vice-president in charge of sales from 1928 until August, 1940.

• Thomas E. Moss Wheat, dean of the Chrysler Graduate School of Engineering, died recently. Mr. Wheat had been connected with the Chrysler Corp. for 10 years as an engineer and engineering instructor. He was born in Starbuck, Wash., and was graduated from the University of Michigan. In 1916 he went to the Philippines as assistant to the superintendent of public works there and constructed a radio transmitter tower, which was said to be the highest in the world at that time.

• Otto H. Siewek, owner of the Siewek Tool & Engineering Co. which operates tool and die plants in Ferndale, Mich., Richmond, Ind., and Hartford, Conn., died recently.

• Jack Evans O'Beay, superintendent of Detroit plants No. 6 and 8 of the Gar Wood Industries, died May 4. He was 38 years old.

• Albert J. McGuire, engineer with R. L. Spitzley Heating Co., Detroit, died May 15 at Camp Breckinridge, Morgansfield, Ky.,

where he was supervising a contract. He had been employed by the Packard Motor Car Co., Harrigan & Reid and the Michigan Public Utilities Commission before joining the Spitzley company in 1935.

- **Fred C. Burton**, for 21 years superintendent of the Capitol Brass Works, died May 13 at Detroit, aged 68 years. He had retired in 1930.

- **Gosta Lofberg**, president, Uddeholm Co. of America, New York, died May 12, aged 46 years. Mr. Lofberg was connected with the company since its inception in 1925, with the exception of the three years from 1934 to 1937, when he was president of SKF Steels, Inc.

- **Henry Luedinghaus**, president of the St. Louis Malleable Castings Co. and of Beck & Corbitt Co., died of a heart ailment. He was 81 years old. Mr. Luedeninghaus was a director of the St. Louis Screw & Bolt Co. and the St. Louis Car Co.

- **Cary D. Waters**, president, C. J. Tagliabue Mfg. Co., Brooklyn, died May 9.



The late George A. Decker, director and past works engineer of the Warner & Swasey Co., Cleveland.

- **E. J. Fuller**, executive vice-president of the Hunt-Spiller Mfg. Corp., Boston, has been elected general manager. **A. B. Root, Jr.**, has been appointed vice-president; **Frank W. Lampton**, sales manager, and **Joseph Goostray**, assistant general manager.

- **B. P. Flint**, pioneer in production of diesel engines, died recently at his home in Marion, Mass. He was 76 years old and for 25 years was associated with MacIntosh & Seymour Corp., New York. He retired in 1929.

- **George A. Decker**, a director of Warner & Swasey Co., and works engineer for 25 years before his retirement two years ago, died in Cleveland, May 13, aged 77 years. In 1882 Mr. Decker became an apprentice for Warner & Swasey Co. He soon became foreman of the lathe department, before he had completed his four-year apprenticeship course. Later he became assistant superintendent and then superintendent and in 1915 became works engineer. He was the oldest living employee of the Warner & Swasey Co.

- **Robert Gilmore**, general manager of the Wire Rope division of the Jones & Laughlin Steel Corp., Muncy, Pa., died May 14 after a heart attack. Mr. Gilmore had been associated with the wire rope industry for the past 50 years and started with Jones & Laughlin in July, 1938.

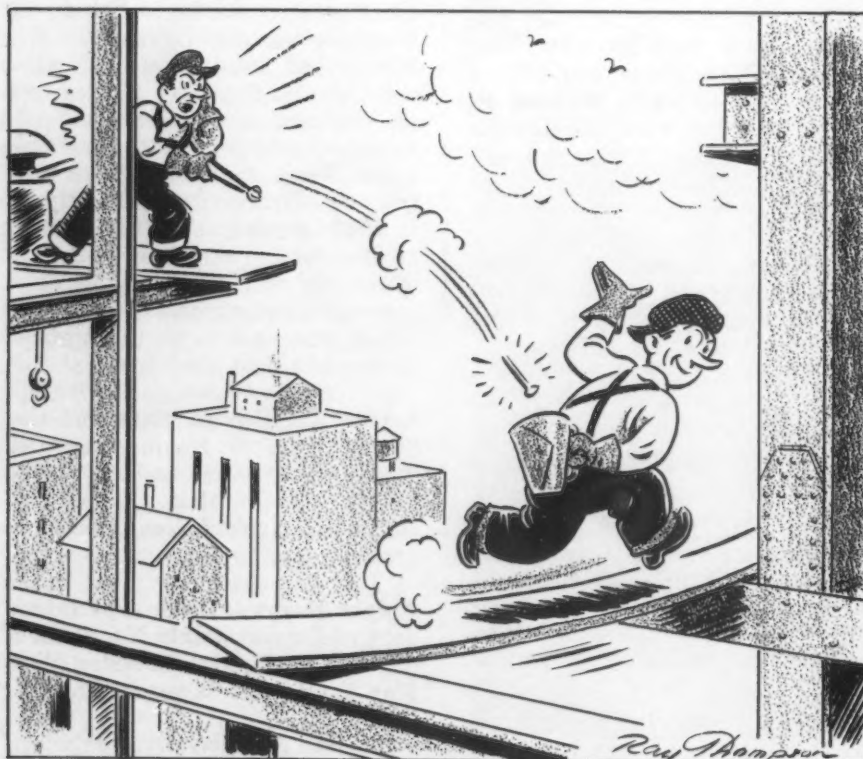
- **William Peterson**, co-partner with his brother in the Peterson Tool Co., Milford, Mass., died May 12 from self inflicted wounds. He was 47 years old.

- **John Egli**, superintendent of Allis-Chalmers Mfg. Co. No. 7 shop at Milwaukee, died May 10 after a short illness. He came to this country from Switzerland 16 years ago and had been with Allis-Chalmers for the last 10 years supervising design and construction of rectifiers and transformers.

- **Harry I. Allen**, since 1907 a member of the law firm of Knapp, Allen and Cushing division counsel of the United States Steel Corp. subsidiaries, died suddenly in Evanston, Ill.

- **Charles W. LaPorte** of the Keystone Steel & Wire Co., Peoria, died May 12, aged 68 years. At the time of his death, he was vice-president of the company, a director and member of the executive committee.

- **Robert M. Bird**, New York district sales manager of the Midvale Co., died May 8.



"Okay, Bennie—You Can Stop Makin' 'Em Look Tough—
The Crowd's Gone Home!"

MACHINE TOOLS

... SALES, INQUIRIES AND MARKET NEWS

Subcontracting Being Pushed For Lack of New Machines

Cleveland

••• The virtual impossibility of securing machines for prompt delivery has resulted in a more aggressive effort by the War Department to foster as much subcontracting as possible. During the past week a large contract was carefully combed over with an eye toward reducing the amount of new equipment that would be necessary for the particular company to handle the contract by arranging for subcontracts for a considerable amount of the work. Similar action is expected to be taken in many other situations, and it is likely that this will result in some cancellations of orders for new machine tools. This development will be further stimulated by Washington's decision to

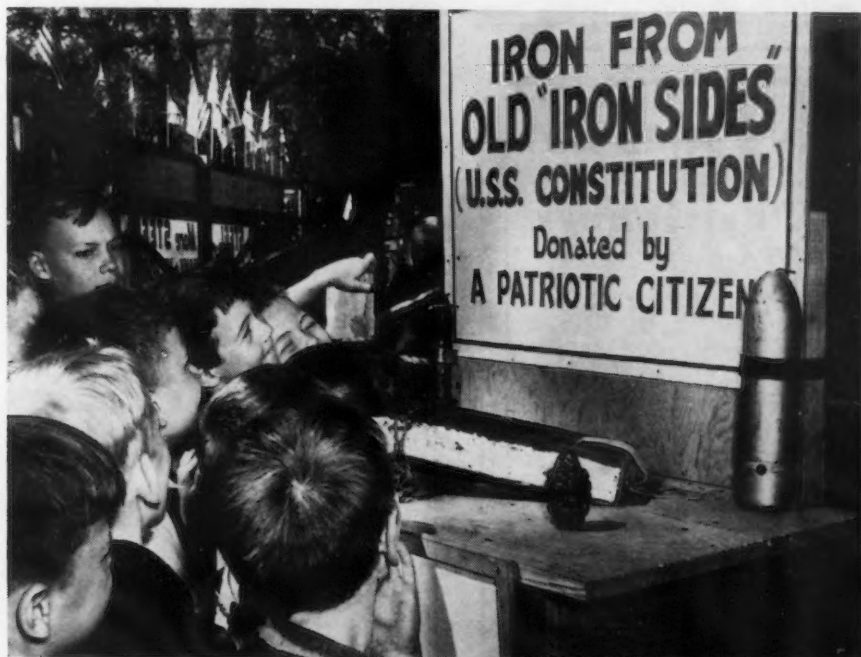
hold up the construction of new plants not expected to be in operation after June, 1943, with some few exceptions. Among the latter exceptions are the large bomber plant to be built in Ohio, a large Midwestern diesel engine plant, a new plant to be built by Vanadium-Alloys, and the Jack & Heintz latest addition.

Despite the growing number of restrictions against the unlimited ordering of machine tools in large quantities, there remain many new defense plants and large munitions installations to be constructed and equipped, involving a considerable amount of machinery and machine tools. One such large plant will require a good number of hydraulic presses, air operated arbor presses, dial feed presses, mixing and straining machines, single spindle facing machines, marking machines, and many other types of equipment.

A Note of Caution Seen

Cincinnati

••• While there have been some cancellations of substantial amounts of business during the past two weeks, this has been offset to a large degree by the influx of new orders. Nevertheless, the trend toward government restriction on further plant expansions, along with these cancellations, has been such as to cause builders in this area at least to explore their retrenchment policies, which have heretofore been in the back of their minds. Consideration, of course, is also being given to the trend of tax legislation, as well as other war moves made in Washington, all to the end that they may keep their plants and business in proper shape. Of course, first consideration continues to be given to an all-out production program with the emphasis on a steadily increasing production rate which bids fair to be greater than last year's and many times greater than the pre-war estimates of capacity. Personnel continues to be quite a problem and while no women have been employed in the machine tool shops directly, several of the associated metal working plants already have women handling heavy machines.



COATESVILLE COOPERATION:

In contrast to some scrap salvage campaigns, the one at Coatesville, Pa., has been very successful, for nearly 200 tons of scrap metals alone have been collected since April 13. Photo at right shows the pile 30 ft. high which will aid Lukens Steel Co. Photo above shows one of the campaign's prize pieces. A "theater" at the Victory Scrap Yard offers entertainment each evening. Price of admission is an armful of scrap.



NON-FERROUS METALS

... MARKET ACTIVITIES AND PRICE TRENDS

Salvage of Used Tubes Will Be Started Soon

... Salvage of the collapsible tubes accumulating in more than 100,000 retail stores will be undertaken within the next few weeks by the Tin Salvage Institute. The Institute is ready to receive the tubes now, but melting will not start until enough have accumulated to make the operation economical. A group of collapsible tube manufacturers formed the Institute earlier this year as a non-profit organization, with several of the large manufacturers of toothpaste and shaving cream donating radio time to spur the voluntary drive.

Following the issuance of WPB order M-115, plans were changed so that the Institute now operates as an MRC subsidiary, headed by M. W. Rose, president of Sun Tube Corp. The plant, located in a

building leased from a Newark, N. J., brush manufacturer, is expected to reclaim about 4000 lb. of tin a day.

A group of 30 girls formerly employed by tube manufacturers will sort the tubes by eye and feel, aided by identifying symbols which have been used on many tubes made since the first of the year. The tops will be removed and impurities, including the paint on the tubes and their remaining contents, will be removed as far as possible as the metal is run down. Live steam or nitrogen with a suitable flux will be bubbled through for this purpose.

Mr. Rose estimates that there is approximately half a million pounds of tubes awaiting reclamation. He points out that Americans used about 675,000,000 tubes last year, or more than 20 tons a day. This year's consumption is expected to amount to 12,000 tons.

The government expects to lose \$65,000,000 to \$75,000,000 on its copper recovery program, according to L. J. Martin, of the WPB. Mr. Martin, in addressing the 27th annual convention of the National Association of Purchasing Agents in New York, stated that the drive to recover frozen aluminum stocks has already netted 28,000,000 lb. of ingots and partly fabricated shapes, though it was expected that only 20,000,000 to 25,000,000 lb. would be recovered. In all cases, Mr. Martin said, the WPB is offering the low wholesale price and he warned that there is a possibility that the government will requisition frozen stocks if the holder refuses to sell.

An interesting point which comes up in connection with WPB seizures of frozen aluminum inventories is also applicable to the Copper Recovery Corporation's announced intention of acquiring some 250,000 tons of frozen copper stocks. It is the often overlooked fact that holders of frozen metal stocks need not take heavy losses in disposing of their inventories. Sell them they must, but not necessarily at scrap prices. Copper ingots must be sold to the Copper Recovery Corp., which will pay market prices. But fabricated copper is not particularly desired by the WPB, because remelting and subsequent conversion to other forms takes time and money. Therefore, holders of rods, sheets, tubes and similar products can and should make every effort to sell them back to the producer or to a plant having high rated orders.

Non-Ferrous Prices

(Cents per lb. for early delivery)

Copper, Electrolytic ¹	12.00
Copper, Lake	12.00
Tin, Straits, New York	52.00
Zinc, East St. Louis ²	8.25
Lead, St. Louis ²	6.35

¹ Mine producers' quotations only, delivered Conn. Valley. Deduct ¼c. for approximate New York delivery price. ² Add 0.39c. for New York delivery. ³ Add 0.15c. for New York delivery.

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 15c.-16c. a lb.; No. 12 remelt No. 2, standard, 14.50c. a lb. NICKEL, electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt; Asiatic, nominal. New York; American, 14.50c. a lb., f.o.b. smelter. QUICKSILVER, \$197 to \$199 per 76 lb. flask, f.o.b. shipping point. BRASS INGOTS, commercial 85-5-5, 13.25c. a lb.

Baldwin Locomotive Works SAVE TIME with Ransome Welding Positioners



Write for Bulletin 200A

THE Baldwin Locomotive Works conserves considerable time and labor with a battery of Ransome Welding Positioners which speedily bring heavy and unwieldy work to desired positions for convenient welding.

The photo at left shows how one of the Positioners is used to advantage for the welding of a Diesel engine cylinder block.

INDUSTRIAL DIVISION

RANSOME CONCRETE MACHINERY COMPANY
DUNELLEN NEW JERSEY

Supply Difficulties Arouse Much Thought

••• The scrap situation has returned to the limelight, with leaders of the steel industry doing much serious thinking about the problem of future supplies. Despite attempts to build stockpiles for next winter, only trifling amounts have been accumulated so far.

WPB last Saturday issued an amendment to Order M-24 removing inventory restrictions of Priorities Regulation No. 1 on iron and steel scrap to encourage the building up of inventories to the greatest possible extent.

Meanwhile, OPA amended the scrap price schedule to permit No. 2 heavy melting steel to cover pieces of scrap 15 in. wide and as much as 5 ft. long, with some exceptions. No change was made in thickness specifications. Previously the maximum lengths and widths permitted were 3 ft. long and 15 in. wide, excepting car sides.

Auto wreckers especially will be assisted by the change in the specification for No. 2 scrap steel. The wreckers won't have to cut their material so much and will require less labor, which has been one of the great difficulties of the junking program.

As the climax to a week in which steel executives issued many statements, at the Iron & Steel Institute meeting and elsewhere concerning the vital role of scrap, WPB Chief Donald Nelson told the New York convention of the National Association of Purchasing Agents that waste is treason and that salvage campaigns must be pushed.

More scrap news appears this week on pages 104 and 105, including special stories from Pittsburgh and Cleveland.

The War Production Board on May 23 called upon consumers of iron and steel scrap to build up inventories to the largest extent possible during the summer months.

To make this possible, the Director of Industry Operations issued an amendment to Order M-24 removing inventory restrictions of Priorities Regulation No. 1 on iron and steel scrap.

C. E. Adams of WPB voiced the

warning to steel producers that only by building up inventory will it be possible to continue extensive steel operations next winter.

"Now that scrap is flowing more freely," he said, "there will be a natural tendency on the part of steel makers to let up on purchases in excess of current demands. If this is done there will be a natural slackening of scrap collection all along the line. Current shipments are a result of a nation-wide effort on the part of the public, the Bureau of Industrial Conservation, the Army and Navy, and scrap dealers. The slightest suggestion of a slackening in demand will be felt all along the line and scrap collections will suffer accordingly.

"Let me urge every mill to pile its yard full of scrap and to get additional storage space if scrap delivery permits. The mill that does not enter next winter with a

substantial inventory is bound to run into difficulties through the winter."

Amendment No. 5 to the revised scrap price schedule sets the following definitions for heavy melting steel, effective May 26:

No. 1 heavy melting steel: Steel scrap $\frac{1}{4}$ in. and over in thickness, not over 18 in. in width, and not over 5 ft. long. Individual pieces must be cut into such shape that they will be free from attachments and will lie flat in a charging box. Cut boiler plate must be practically clean and free from stay bolts and lie reasonably flat in charging box. No piece may weigh less than 5 lb. This grade may include structural shapes, angle bars and plates, steel castings, heavy chain, carbon tool steel, heavy forgings, forge butts and similar heavy material. This grade may also include new mashed pipe ends, original diameter 4 in. and over, thoroughly flattened, rail ends, and wrought scrap, such as angles, splices, couplers, knuckles, short rails, drawbars, cut cast-steel bolsters, coil and leaf springs (all coil springs to be $\frac{3}{8}$ in. or larger in diameter). May include flashings between 2 and 5 ft. long. No needle or skeleton plate scrap, agricultural shapes, annealing pots, boiler tubes, grate bars, cast iron, malleable iron, or curly or unwieldy pieces will be accepted. This grade must be free from dirt, excessive rust or scale, or foreign material of any kind.

No. 2 heavy melting steel: Plate scrap, such as car sides, automobile frame stock, tank, and skelp crops, $\frac{1}{8}$ -in. and heavier,

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steel parts of agricultural implements, wagons, buggies, and scrapped automobiles, auto and buggy springs cut apart, rods and bars, 1/2-in. and heavier, punchings, 1/4-in. and over in thickness, heavy clippings, new unmashed pipe ends, under 4 in. in diameter, horseshoes, and similar material. Car sides and all light plates to be sheared 15 by 15 in. or under and all tires and light rods to be 12 in. and under in length. Any curved or twisted pieces must be sheared into such shape that they will lie flat in a charging box and not tangle in handling with magnet, all to be free from brass, copper, lead, zinc, tin, terneplate, cast iron, malleable iron, burnt scrap, dirt, or foreign material of any kind. The maximum size is 15 in. wide by 5 ft. long, excepting car sides.

April Scrap Consumption Off from March Record

••• Consumption of iron and steel scrap in April amounted to 4,672,000 tons, compared with the record melt of 4,840,000 in March and with 4,406,000 in April, 1941, according to the Institute of Scrap.

In the first four months of this year consumption was 18,378,000 tons, against 17,518,000 in the similar period of 1941.

CHICAGO—The sense of humor of steel mill scrap buyers was tested severely when WPB announced it was encouraging stocking of scrap. Mills are barely able to hold their own in the way of

scrap receipts and yard stocks are all located as soon as built up. While OPA enforcement activities throughout the country are forcing stricter observance of specifications they are also restricting the flow of scrap. The likelihood of being able to do any stocking before winter, unless the schedule is considerably modified, is considered very remote. Meanwhile, scrap brokers and dealers are keeping mills supplied with sufficient scrap to set a new production record this week, but mill stocks are not being built up.

PITTSBURGH—Little or no change has occurred here. A slight slowing up at some points may be due to recent injunction proceedings by the OPA. The amount of scrap steelmakers here have been able to put aside for next winter is negligible.

PHILADELPHIA—Confusion and a certain amount of controversy prevail over OPA rulings on grading and pricing. One dealer points out that strict adherence to specifications is causing rejection of normally acceptable cars.

NEW YORK—Mobilization of 26,000 manufacturers in a huge drive to get more scrap was achieved here this week. Chairman of the newly formed Industrial Salvage Board is R. P. Hamilton of American Radiator & Standard Sanitary Corp. The 26,000 manufacturers were warned that those who failed to place

their scrap at the disposal of the government might be deprived of raw materials.

CLEVELAND—The market has improved so much that interest in tin can bundles has diminished. Inspections are more strict. The position of foundries on defense work has improved. The situation in the Warren-Youngstown-Massillon area is still a touch-and-go affair, and it is reported that within the past 10 days a Lake shipment of scrap originally intended for Buffalo was unloaded at Cleveland for diversion to the Youngstown area. The electric furnace scrap situation in Ohio is reported to be most critical since the special grades required for these melting units are difficult to secure. Partly, this situation results from the diversion of some material to open-hearths and foundries, and partly it is due to expanding electric furnace capacity.

BUFFALO—The International Harvester Co.'s scrap drive in ten Western New York counties had netted approximately 8000 tons by last weekend, drive officials reported. Five more barges of No. 1 and No. 2 heavy melting scrap have arrived from New York at Fort Erie, Ont., for trans-shipment to Welland, Ont., steel plants.

CINCINNATI—OPA specifications on old materials are causing a severe headache in the district market. The chief difficulty arises from an uncertainty on the part of the dealers as to whether

More scrap news appears on Pages 104 and 105.

OPA is going to enforce specifications literally or allow some deviation, and as a result, some scrap is being held back. Despite this, the movement continues fairly good.

BIRMINGHAM—Approximately 13,000 civilian defense workers will participate here June 9 in a county-wide "scrap-out," designed to make available for war needs both scrap metal and rubber.

BOSTON—The volume of scrap coming on the market may have passed its peak, yards either reporting no increase or a slight falling off. However, the supply is larger than it was two months ago and Massachusetts salvage officials say additional tonnages will soon be available.

ST. LOUIS—Once again receipts of scrap by mills in this area have been stepped up following a letdown as a result of bad weather. Ingot operations continue at a high rate. As a St. Louis WPA project 53,750 feet of abandoned street car rails will be salvaged.

WASHINGTON—The industrial salvage section of the Bureau of Industrial Conservation is distributing report blanks, printed in the form of self-addressed post cards, setting forth the movement and disposal of scrap materials. The blanks are being distributed by the regional offices of the BIC and it is hoped that they will eventually be placed in the hands of the salvage managers of all manufacturers.

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Prices of Finished Iron and Steel . . .

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point ↓ Product													10 DELIVERED TO		
	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	Detroit	New York	Phila- delphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.22¢	2.35¢	2.28¢
Cold rolled ¹	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.17¢	3.41¢	3.39¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.75¢	3.68¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.47¢	3.73¢	3.69¢
Long ternes ²	3.80¢		3.80¢									4.55¢		4.18¢	4.14¢
STRIP															
Hot rolled ³	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.22¢	2.48¢	
Cold rolled ⁴	2.80¢	2.90¢		2.80¢			2.80¢		(Worcester = 3.00¢)				2.92¢	3.18¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.58¢	
Commodity C-R	2.95¢			2.95¢			2.95¢		(Worcester = 3.35¢)				3.07¢	3.33¢	
TIN PLATE															
Standard cokes, base box	\$5.00	\$5.00	\$5.00						\$5.10					5.38¢	5.34¢
BLACK PLATE															
29 gage ⁵	3.05¢	3.05¢	3.05¢						3.15¢			13 4.05¢			3.39¢
TERNES, M'FG.															
Special coated, base box	\$4.30	\$4.30	\$4.30						\$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			(Duluth = 2.25¢)		2.52¢	2.80¢	2.27¢	2.51¢	2.49¢
Rail steel ⁶	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.52¢	2.80¢ 14			
Reinforcing (billet) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.52¢	2.55¢ 14	2.27¢	2.40¢	
Reinforcing (rail) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.52¢	2.55¢	2.27¢		2.49¢
Cold finished ⁸	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit = 2.70¢)					3.01¢	2.99¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢			(Bethlehem, Massillon, Canton = 2.70¢)				2.82¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.47¢		
									(Coatesville and Claymont = 2.10¢)						
PLATES															
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢ ⁽¹¹⁾		2.47¢	2.65¢	2.27¢	2.30¢	2.155¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.72¢	4.00¢		3.73¢	3.69¢
Alloy	3.50¢	3.50¢							(Coatesville = 3.50¢)		3.97¢	4.15¢		3.71¢	3.60¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢			(Bethlehem = 2.10¢)		2.47¢	2.75¢		2.28¢	2.22¢
SPRING STEEL, C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢					(Worcester = 3.00¢)						
0.51 to 0.75 Carbon	4.30¢			4.30¢					(Worcester = 4.50¢)						
0.76 to 1.00 Carbon	6.15¢			6.15¢					(Worcester = 6.35¢)						
1.01 to 1.25 Carbon	8.35¢			8.35¢					(Worcester = 8.55¢)						
WIRE⁹															
Bright ¹⁵	2.60¢	2.60¢		2.60¢	2.60¢				(Worcester = 2.70¢)			3.10¢			2.94¢
Galvanized	add proper size extra and galvanized extra to bright wire base, above.														
Spring (High Carbon)	3.20¢	3.20¢		3.20¢					(Worcester = 3.30¢)			3.70¢			3.54¢
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.74¢
IRON BARS¹²															
Wrought single refined	4.40¢														
Wrought double refined	5.40¢														

¹ Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. ² Unassorted 8-lb. coating. ³ Widths up to 12 in. ⁴ Carbon 0.25 per cent and less. ⁵ Applies to certain width and length limitations. ⁶ For merchant trade. ⁷ Prices for straight length material only, from a producer to a consumer. Functional discount of 25c. per 100 lb. to fabricators. ⁸ Also shafting. For quantities of 20,000 to 39,999 lb. ⁹ Carload lot to manufacturing trade. ¹⁰ These prices do not apply if the customary means of transportation (rail and water) are not used. ¹¹ Ship plates only. ¹² Common iron bars quoted at 2.15c. by Terre Haute, Ind. producer. ¹³ Boxed. ¹⁴ Portland and Seattle price, San Francisco price is 2.50c. ¹⁵ This bright wire base price to be used in figuring annealed and bright finish wires, commercial spring wire and galvanized wire.

Comparison of Prices . . .

(Advances Over Past Week in **Heavy Type**; Declines in *Italics*. Prices Are F.O.B. Major Basing Points)

Flat Rolled Steel: (Cents Per Lb.)	May 26, 1942	May 19, 1942	Apr. 28, 1942	May 27, 1941
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00

Tin and Terne Plate: (Dollars Per Base Box)	May 26, 1942	May 19, 1942	Apr. 28, 1942	May 27, 1941
Tin plate	\$5.00	\$5.00	\$5.00	\$5.00
Manufacturing ternes	4.30	4.30	4.30	4.30

Bars and Shapes: (Cents Per Lb.)	May 26, 1942	May 19, 1942	Apr. 28, 1942	May 27, 1941
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00

Wire and Wire Products: (Cents Per Lb.)	May 26, 1942	May 19, 1942	Apr. 28, 1942	May 27, 1941
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55

Rails: (Dollars Per Gross Ton)	May 26, 1942	May 19, 1942	Apr. 28, 1942	May 27, 1941
Heavy rails	\$40.00	\$40.00	\$40.00	\$40.00
Light rails	40.00	40.00	40.00	40.00

Semi-Finished Steel: (Dollars Per Gross Ton)	May 26, 1942	May 19, 1942	Apr. 28, 1942	May 27, 1941
Rerolling billets	\$34.00	\$34.00	\$34.00	\$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy blooms, billets, bars	54.00	54.00	54.00	54.00

Wire Rods and Skelp: (Cents Per Lb.)	May 26, 1942	May 19, 1942	Apr. 28, 1942	May 27, 1941
Wire rods	2.00	2.00	2.00	2.00
Skelp (grvd)	1.90	1.90	1.90	1.90

Pig Iron: (Per Gross Ton)	May 26, 1942	May 19, 1942	Apr. 28, 1942	May 27, 1941
No. 2 fdy., Philadelphia	\$25.89	\$25.89	\$25.89	\$25.84
No. 2, Valley furnace	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti	24.68	24.68	24.68	24.06
No. 2, Birmingham	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa.	25.39	25.39	25.39	25.34
Basic, Valley furnace	23.50	23.50	23.50	23.50
Malleable, Chicago†	24.00	24.00	24.00	24.00
Malleable, Valley	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago	31.34	31.34	31.34	31.34
Ferromanganese†	135.00	135.00	120.00	120.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
†For carlots at seaboard.

Scrap: (Per Gross Ton)	May 26, 1942	May 19, 1942	Apr. 28, 1942	May 27, 1941
Heavy melting steel, P'gh.	\$20.00	\$20.00	\$20.00	\$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	17.85
Low phos. plate, Youngs'n	22.50	22.50	22.50	23.00
No. 1 cast, Pittsburgh	20.00	20.00	20.00	22.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	24.00
No. 1 cast, Ch'go	20.00	20.00	20.00	20.00

Coke, Connellsville: (Per Net Ton at Oven)	May 26, 1942	May 19, 1942	Apr. 28, 1942	May 27, 1941
Furnace coke, prompt	\$6.00	\$6.00	\$6.00	\$6.125
Foundry coke, prompt	6.875	6.875	6.875	6.875

Non-Ferrous Metals: (Cents per Lb. to Large Buyers)	May 26, 1942	May 19, 1942	Apr. 28, 1942	May 27, 1941
Copper, electro., Conn.	12.00	12.00	12.00	12.00
Copper, Lake, New York	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	52.125
Zinc, East St. Louis	8.25	8.25	8.25	7.25
Lead, St. Louis	6.35	6.35	6.35	5.70
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 121 to 128 herein.

Composite Prices . . .

FINISHED STEEL		PIG IRON		SCRAP STEEL	
May 26, 1942	2.30467c. a Lb. . . . .	.....	\$23.61 a Gross Ton . . . . .	.....	\$19.17 a Gross Ton
One week ago	2.30467c. a Lb. . . . .	.....	\$23.61 a Gross Ton . . . . .	.....	\$19.17 a Gross Ton
One month ago	2.30467c. a Lb. . . . .	.....	\$23.61 a Gross Ton . . . . .	.....	\$19.17 a Gross Ton
One year ago	2.30467c. a Lb. . . . .	.....	\$23.61 a Gross Ton . . . . .	.....	\$19.17 a Gross Ton

HIGH		LOW		HIGH		LOW	
1942	2.30467c.,	2.30467c.,	\$23.61	\$23.61	\$19.17	\$19.17	
1941	2.30467c.,	2.30467c.,	\$23.61, Mar. 20	\$23.45, Jan. 2	\$22.00, Jan. 7	\$19.17, Apr. 10	
1940	2.30467c., Jan. 2	2.24107c., Apr. 16	23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9	
1939	2.35367c., Jan. 3	2.26689c., May 16	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16	
1938	2.58414c., Jan. 4	2.27207c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7	
1937	2.58414c., Mar. 9	2.32263c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10	
1936	2.32263c., Dec. 28	2.05200c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9	
1935	2.07642c., Oct. 1	2.06492c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29	
1934	2.15367c., Apr. 24	1.95757c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25	
1933	1.95578c., Oct. 3	1.75836c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3	
1932	1.89196c., July 5	1.83901c., Mar. 1	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5	
1931	1.99629c., Jan. 13	1.86586c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29	
1930	2.25488c., Jan. 7	1.97319c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9	
1929	2.31773c., May 28	2.26498c., Oct. 29	18.71 May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3	

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

SCRAP PRICES

(All the prices given below are per gross tons and are basing point prices from which shipping point prices and consumer's delivered prices are to be computed)

IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

	BASIC OPEN HEARTH GRADES (No. 1 Heavy Melting; No. 1 Hydr. Com- pressed Black Sheets; No. 2 Heavy Melting; Dealers' No. 1 Bundles; Dealers' No. 2 Bundles; No. 1 Busheling)		Machine Shop Turnings	BLAST FURNACE GRADES (Mixed Borings and Turnings; Shovelling Turnings; No. 2 Busheling; Cast Iron Borings)		ELECTRIC FURNACE, ACID OPEN HEARTH AND FOUNDRY GRADES											
						Low Phos.			Heavy Structural and Plate			Cut Auto. Steel Scrap			Alloy free Low Phos. and Sulphur Turnings	Heavy Axle and Forge Turn. First Cut	Electric Furnace Bundles
						Billet, Bloom, Forge Crops	Bar Crops and Smaller	Punch- ings and Plate	3 ft. and Under	2 ft. and Under	1 ft. and Under	3 ft. and Under	2 ft. and Under	1 ft. and Under			
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton.....	\$20.00	\$16.00		\$16.00	\$25.00	\$22.50	\$22.50	\$21.00	\$21.50	\$22.00	\$20.00	\$20.50	\$21.00	\$18.00	\$19.50	\$21.00	
Cleveland, Middletown, Cincinnati, Portsmouth.....	19.50	15.50		15.50	24.50	22.00	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50	
Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Pt....	18.75	14.75		14.75	23.75	21.25	21.25	19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	19.75	
Ashland, Ky.....	19.50	15.50		15.50	24.50	22.00	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50	
Buffalo, N. Y.....	19.25	15.25		15.25	24.25	21.75	21.75	20.25	20.75	21.25	19.25	19.75	20.25	17.25	18.75	20.25	
Bethlehem, Pa.; Kokomo, Ind..	18.25	14.25		14.25	23.25	20.75	20.75	19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25	
Duluth, Minn.....	18.00	14.00		14.00	23.00	20.50	20.50	19.00	19.50	20.00	18.00	18.50	19.00	16.00	17.50	19.00	
Detroit, Mich.....	17.85	13.85		13.85	22.85	20.35	20.35	18.85	19.35	19.85	17.85	18.35	18.85	15.85	17.35	18.85	
Toledo, Ohio.....		13.85		13.85													
St. Louis, Mo.....	17.50	13.50		13.50	22.50	20.00	20.00	18.50	19.00	19.50	17.50	18.00	18.50	15.50	17.00	18.50	
Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles; Pittsburg, Cal.; San Francisco	17.00	13.00		13.00	22.00	19.50	19.50	18.00	18.50	19.00	17.00	17.50	18.00	15.00	16.50	18.00	
Minneapolis, Colo.....	16.50	12.50		12.50	21.50	19.00	19.00	17.50	18.00	18.50	16.50	17.00	17.50	14.50	16.00	17.50	
Seattle, Wash.....	14.50	10.50		10.50	19.50	17.00	17.00	15.50	16.00	16.50	14.50	15.00	15.50	12.50	14.00	15.50	
Portland, Ore.....						15.50	15.50	14.00	14.50	15.00	13.00	13.50	14.00	11.00	12.50	14.00	

BUNDLES consisting exclusively of tin coated material and compressed into charging box size, are \$4 per gross ton below No. 2 dealers' bundles. Bundles containing tin coated material but not composed exclusively of such material (outlawed by order M-24-b) are \$8 below No. 2 dealers' bundles.

PITTSBURGH basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport. Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of S. San Francisco, Niles and Oakland, Cal.

MAXIMUM prices of inferior grades shall continue to bear same differential below corresponding grades as existed during the period Sept. 1, 1940, to Jan. 31, 1941. Superior grades cannot be sold at a premium without approval of OPA. Special preparation charges in excess of the above prices are banned. Whenever any electric furnace or foundry grades are purchased for open hearth or blast furnace use, prices may not exceed the prices above for the corresponding open hearth grades.

MAXIMUM SHIPPING POINT PRICE—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad car or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing point, the price in table above at the most favorable basing point minus the lowest transportation charge by rail or water or combination thereof. Published dock charges prevail, or if unpublished 75c. per ton must be included as part of the deduction.* Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points take price listed in table minus lowest switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transporting by common carrier. If no established transportation rate exists, the customary costs are deducted. Published dock charges prevail. If unpublished include 75c.* For exceptions see official order.

*At Memphis deduct 50c.; Great Lakes ports \$1; New England \$1.25.

REMOTE SCRAP: Defined as all grades of scrap listed in table above located in North Dakota, South Dakota, Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon and Utah. The delivered price of remote scrap may exceed by more than \$1, but not more than \$5, the price at the basing point nearest the consumer's plant, provided detailed statement under oath is furnished OPA. Where delivered price would exceed by more than \$5 the price at basing point nearest consumer, user must apply to OPA for permission to absorb the additional charges. For exceptions see official order.

UNPREPARED SCRAP: The maximum prices established hereinabove are maximum prices for prepared scrap. For unprepared scrap, maximum prices shall be \$2.50 less than the maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Converter may charge \$2.50 per ton on consumer-owned unprepared remote scrap (see order).

Where more than one grade of scrap is included in a shipment, the maximum price of all scrap in the vehicle is that of the lowest price grade in the shipment. This limitation does not apply to vessel shipments if grades are segregated.

Where scrap is to undergo preparation prior to its arrival at the point of delivery, such scrap is not at its shipping point, as that phrase is defined above, until after preparation has been completed.

CAST IRON BORINGS: (No more than 0.5 per cent oil content; for chemical use), add \$5 to price of cast iron borings.

UNPREPARED CAST IRON SCRAP—Except for heavy breakable cast, unprepared scrap is given a price ceiling of \$2.50 per ton less than the maximum prices for the corresponding grade of prepared cast iron scrap. Where scrap is to undergo preparation prior to arrival at the point of delivery, such scrap is not considered at shipping point until preparation is completed.

Consumers of cast scrap may pay the shipping point price plus established charge for transporting the scrap to their plants. In the case of deliveries by truck, the cast scrap buyer must obtain from the seller a certification, made out to OPA, of the shipping point, transportation charges and details of the sale.

RAILROAD SCRAP

(Per gross ton, delivered consumers' plants located on line.)

	Scrap Rails					
	No. 1 RR Heavy Melting	Scrap Rails	Rails for Re-rolling	3 ft. and Under	2 ft. and Under	18 in. and Under
Cleveland, Cincinnati, Ashland, Portsmouth, Middletown.....	\$20.50	\$21.50	\$22.00	\$23.50	\$23.75	\$24.00
Canton, Pittsburgh, Sharon, Steubenville, Wheeling, Youngstown.....	21.00	22.00	23.50	24.00	24.25	24.50
Chicago, Philadelphia, Sparrows Pt., Wilmington, Birmingham, Los Angeles, San Francisco.....	19.75	20.75	22.25	22.75	23.00	23.25
Buffalo.....	18.00	19.00	20.50	21.00	21.25	21.50
Detroit.....	20.25	21.25	22.75	23.25	23.50	23.75
Duluth.....	18.85	19.85	21.35	21.85	22.10	22.35
Kansas City, Mo.....	19.00	20.00	21.50	22.00	22.25	22.50
Kokomo, Ind.....	17.00	18.00	19.50	20.00	20.25	20.50
Seattle.....	19.25	20.25	21.75	22.25	22.50	22.75
St. Louis.....	15.50	16.50	18.00	18.50	18.75	19.00
	18.50	19.50	21.00	21.50	21.75	22.00

CAST IRON SCRAP

Other Than Railroad Scrap

	Group A	Group B	Group C
No. 1 machinery cast, drop broken, 150 lbs.			
No. 1 cupola cast.....	\$18.00	\$19.00	\$20.00
and under.....	18.00	19.00	20.00
Clean auto cast.....	18.00	19.00	20.00
Unstripped motor blocks.....	17.50	18.50	19.50
Stove Plate.....	17.00	18.00	19.00
Heavy Breakable Cast.....	15.50	16.50	17.50
Charging box size cast.....	17.00	18.00	19.00
Misc. Malleable.....	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C: States not named in A and B; switch district of Kansas City, Kan., Mo.

PRICES

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are \$2 higher; f.o.b. Duffuth, billets only, \$2 higher.

Per Gross Ton

Rerolling\$34.00
Forging quality 40.00

Shell Steel

Per Gross Ton

3 in. to 12 in.....\$52.00
12 in. to 18 in..... 54.00
18 in. and over..... 56.00

Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.

Prices delivered Detroit are \$2.25 higher.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton

Open hearth or bessemer.....\$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Per Lb.

Grooved, universal and sheared 1.90c

Wire Rods

(No. 5 to 9/32 in.)

Per Lb.

Pittsburgh, Chicago, Cleveland. 2.00c
Worcester, Mass. 2.10c
Birmingham 2.00c
San Francisco 2.50c
Galveston 2.25c

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

Alloy Steel Blooms, Billets and Slabs

Pittsburgh, Chicago, Canton

Massillon, Buffalo, or Bethlehem, per gross ton.....\$54.00

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)

Base per Lb.

High speed 67c
Straight molybdenum 54c
Tungsten-molybdenum 57½c
High-carbon-chromium 43c
Oil hardening 24c
Special carbon 22c
Extra carbon 18c
Regular carbon 14c

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi, 3c. higher.

WAREHOUSE PRICES

(Delivered Metropolitan areas, per 100 lb. See THE IRON AGE, Dec. 25, 1941, page 88, for details of OPA Price Schedule No. 49, covering steel resale prices. These prices do not necessarily apply for dislocated tonnage shipments when the f.o.b. city prices are used in conformance with Schedule 49.)

	Pitts- burgh	Chicago	Cleve- land	Phila- delphia	New York	Detroit	Buffalo	Boston	Birm- ingham	St. Louis	St. Paul	Mil- waukee	Los†
Sheets, hot rolled (10 ga.)	\$3.35	\$3.25	\$3.35	\$3.55	\$3.58	\$3.43	\$3.25	\$3.71	\$3.45	\$3.39	\$3.50	\$3.38	\$4.95
Sheets, cold rolled	4.10	4.05	4.05	4.05	4.60	4.30	4.30	4.68	4.24	4.35	4.23	7.50	
Sheets, galv. (24 ga.)	4.65	4.85	4.62	5.05	5.00	4.84	4.75	5.11	4.75	4.99	5.00	4.98	5.95
Strip, hot rolled	3.60	3.60	3.50	3.51	3.96	3.68*	3.82	4.06	3.70	3.74	3.85	3.73	4.90
Strip, cold rolled	3.20	3.50	3.20	3.31	3.51	3.40	3.52	3.46	3.61	3.83	3.54	4.90	
Plates (½ in. & heavier)	3.40	3.55	3.40	3.55	3.76	3.60	3.62	3.85	3.55	3.69	3.80	3.68	4.60
Structural shapes	3.40	3.55	3.58	3.55	3.75	3.65	3.40	3.85	3.55	3.69	3.80	3.68	4.60
Bars, hot rolled	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.64	3.75	3.63	4.35
Bars, cold finished	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.48	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300	7.45	7.35	7.55	7.31	7.60	7.67	7.35	7.75	7.75	7.72	7.45	7.58	9.55
Bars, ht. rld. SAE 3100	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	6.02	6.00	5.88	8.55	
Bars, cd. drn. SAE 2300	8.40	8.40	8.40	8.56	8.84	8.70	8.40	8.88	8.77	8.84	8.63	10.55	
Bars, cd. drn. SAE 3100	6.75	6.75	7.75	7.16	7.19	7.05	6.75	7.23	7.12	7.44	6.98	9.55	

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb., cold rolled strips, 0.0971 in. thick; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb., cold rolled strip 0.095 in. and lighter; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb.; New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, cold rolled sheets, 300 to 1999 lb.; galvanized sheets, 1 to 6 bundles; cold finished bars, 1 to 99 lb.; SAE bars, 100 lb. Extras for size, quality, etc., apply on above quotations. * 12 gage and heavier, \$3.43. † Los Angeles prices reflect special provisions of amendment No. 2 to OPA Price Schedule No. 49.

PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices are delivered quotations per gross ton computed on the basis of the official maxima.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phos- phorus	Charcoal
Boston††	\$25.53	\$25.03	\$26.53	\$26.03	.....	.....
Brooklyn	27.65	.....	.....	28.15	.....	.....
Jersey City	26.62	26.12	27.62	27.12	.....	.....
Philadelphia	25.89	25.39	26.89	26.39	.....	.....
Bethlehem, Pa.	\$25.00	\$24.50	\$26.00	\$25.50	.....	.....
Everett, Mass.††	25.00	24.50	26.00	25.50	.....	.....
Swedeland, Pa.	25.00	24.50	26.00	25.50	.....	.....
Steelton, Pa.	25.00	24.50	26.00	25.50	\$29.50	.....
Birdsboro, Pa.	25.00	24.50	26.00	25.50	29.50	.....
Sparrows Point, Md.	25.00	24.50	26.00	25.50	.....	.....
Erie, Pa.	24.00	23.50	25.00	24.50	.....	.....
Neville Island, Pa.	24.00	23.50	24.50	24.00	.....	.....
Sharpsville, Pa.*	24.00	23.50	24.50	24.00	.....	.....
Buffalo	24.00	23.00	25.00	24.50	29.50	.....
Cincinnati	24.68	24.68	.....	25.18	.....	.....
Canton, Ohio	25.47	24.97	25.97	25.47	.....	.....
Mansfield, Ohio	26.06	25.56	26.56	26.06	.....	.....
St. Louis	24.53	24.05	.....	.....	.....	.....
Chicago	24.00	23.50	24.50	24.00	.....	\$31.34
Granite City, Ill.	24.00	23.50	24.50	24.00	.....	.....
Cleveland	24.00	23.50	24.50	24.00	.....	.....
Hamilton, Ohio	24.00	23.50	.....	24.00	.....	.....
Toledo	24.00	23.50	24.50	24.00	.....	.....
Youngstown*	24.00	23.50	24.50	24.00	.....	.....
Detroit	24.00	23.50	24.50	24.00	.....	.....
Lake Superior fe.	.....	.....	.....	.....	.....	\$28.00
Lyles, Tenn. fe.†	.....	.....	.....	.....	.....	33.00
St. Paul	26.76	.....	27.26	26.76	.....	.....
Duluth	24.50	.....	25.00	24.50	.....	.....
Birmingham	20.38	19.00	25.00	.....	.....	.....
Los Angeles	27.25	.....	.....	.....	.....	.....
San Francisco	27.25	.....	.....	.....	.....	.....
Seattle	27.25	.....	.....	.....	.....	.....
Provo, Utah	22.00	.....	.....	.....	.....	.....
Montreal	27.50	27.50	.....	28.00	.....	.....
Toronto	25.50	25.50	.....	26.00	.....	.....

GRAY FORGE IRON

Valley or Pittsburgh furnace \$23.50

*Pittsburgh Coke & Iron Co. (Sharpsville, Pa. furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

††Eastern Gas & Fuel Associates, Boston, is permitted to sell pig iron produced by its selling company, Mystic Iron Works, Everett, Mass., at \$1 per gross ton above maximum prices.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade (1.75 per cent to 2.25 per cent).

Phosphorous Differential: Basing point prices are subject to a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over.

†Price shown is for low-phosphorous iron; high-phosphorous sells for \$28.50 at the furnace.

Manganese Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.50 per cent manganese content in excess of 1.00 per cent.

ZINC IN WAR




PROTECTING THE MERCHANT MARINE

The United States must not only out-produce our enemies, we must see to it that this matériel reaches the far flung fighting fronts. To this end America has dedicated itself to the most gigantic ship building program in all history—and these vessels must be made as efficient as humanly possible for the courageous men who sail them.

Zinc plays an important role in protecting metal surfaces, and thus protecting men at sea. Working metal parts on ships can easily be fouled by rust. To insure efficient operation when emergencies demand quick action, such important parts as life-boat davits, shown above, are sprayed with protective zinc coatings. The corrosion-inhibiting properties of galvanized (zinc coated) iron or steel are well known—and sprayed zinc dust provides this same measure of protection for metal surfaces which do not lend themselves to galvanizing.

The photographs in the background of this advertisement show: (1)—left to right—Cast iron sheaves for life-boat davits before finishing, after grit blasting and after spraying. (2) Stacks of completely finished sheaves. (3) Grit blasting the sheaves and (4) Spraying them with zinc dust using a special gun.

Other important uses for sprayed zinc include marine floats, airplane pontoons and canal gates. The needs of the Navy and Merchant Marine for sprayed zinc coatings are just additional reasons why civilian users of zinc may not be able to obtain all of the metal or pigment they would like to use.

THE NEW JERSEY ZINC COMPANY
MANUFACTURERS OF THE FAMOUS  HORSE HEAD ZINC PRODUCTS

8
METAL
SPRAYING

GALVAN-
IZING

NICKEL
SILVER

1
HULL
PLATES

2
RUBBER

3
PAINT

4
BRASS

5
CERAMICS

6
DIE
CASTING

7
PHARMA-
CEUTICALS



PRICES

CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F. Billets	15.725c.	16.15c.	19.125c.	23.375c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip	17.00c.	17.50c.	24.00c.	35.00c.
Cold st.	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
*Motor	4.95c.
*Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

F.o.b. Granite City, add 10c. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, per Package of 112 Sheets)

	20x14 in.	20x23 in.
8-lb. coating I.C.	\$6.00	\$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent off List

Machine and Carriage Bolts:

6½ in., shorter and smaller	65½
6 x ⅝ in., and shorter	63½
6 in. by ¾ to 1 in. and shorter	61
1½ in. and larger, all length	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed:

(Hexagon or Square)

½ in. and smaller	62
9/16 to 1 in. inclusive	59
1½ to 1½ in. inclusive	57
1½ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	U.S.S.	S.A.E.
7/16 in. and smaller	64	
½ in. and smaller	62	
½ in. through 1 in.	60	
9/16 to 1 in.	59	
1½ in. through 1½ in.	57	58
1½ in. and larger	56	

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose	71 and 10
Stove bolts in packages, with nuts attached	71
Stove bolts in bulk	80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

Large Rivets

(½ in. and larger)

Base per 100 lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	\$3.75
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Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 5
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Cap and Set Screws

Per Cent Off List

Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller	60
Upset set screws, cup and oval points	68
Milled studs	40
Flat head cap screws, listed sizes	30
Filister head cap, listed sizes	46

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

Base per Keg

Standard wire nails	\$2.55
Coated nails	2.55
Cutnails, carloads	3.85

Base per 100 Lb.

Annealed fence wire	\$3.05
Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barbless wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

Note: Birmingham base same on above items, except spring wire.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes Minimum Wall

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless	Lap Weld	Cold Hot	Hot
	Drawn	Rolled	Rolled	
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38	
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58	
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35	
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15	
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66	

(Extras for less carload quantities)

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills (F.o.b. Pittsburgh only on wrought pipe)

Base Price—\$200 per Net Ton

Steel (Butt Weld)

	Black	Galv.
½ in.	63½	51
¾ in.	66½	55
1 to 3 in.	68½	57½

Wrought Iron (Butt Weld)

½ in.	24	3½
¾ in.	30	10
1 and 1¼ in.	34	16
1½ in.	38	18½
2 in.	37½	18

Steel (Lap Weld)

2 in.	61	49½
2½ and 3 in.	64	52½
3½ to 6 in.	66	54½

Wrought Iron (Lap Weld)

2 in.	30½	12
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17

Steel (Butt, extra strong, plain ends)

	Black	Galv.
½ in.	61½	50½
¾ in.	65½	54½
1 to 3 in.	67	57

Wrought Iron (Same as Above)

½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19½

Steel (Lap, extra strong, plain ends)

2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56

Wrought Iron (Same as Above)

2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card. F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher on all butt weld.

CAST IRON WATER PIPE

Per Net Ton

6-in. and larger, del'd Chicago	\$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles	69.40
6-in. and larger f.o.b. cars Seattle	71.20

Class "A" and gas pipe, \$3 extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is \$45 at Birmingham and \$53.80 delivered Chicago, \$59.40 at San Francisco and Los Angeles, and \$70.20 at Seattle.

FUEL OIL

No. 3 f.o.b. Bayonne, N. J.	5.20c.
No. 6, f.o.b. Bayonne, N. J.	4.285c.
No. 6 Bur. Std., del'd Chicago	4.75c.
No. 3 distillate del'd Cleveland	6.50c.
No. 4 indus., del'd Cleveland	6.00c.
No. 5 indus., del'd Cleveland	5.25c.
No. 6 indus., del'd Cleveland	5.25c.

In every size and type—from 10,000 to 200,000 lbs., for handling bars, tubes or special shapes—the particular endurance, smoothness and safety of Vaughn Draw Benches provide a margin of extra capacity on even the most exacting demands of today.



Capacity

TO MEET YOUR REALLY TOUGH
PRODUCTION SCHEDULES . . .
... AND MORE!



Vaughn

DRAW BENCHES



THE VAUGHN MACHINERY COMPANY
CUYAHOGA FALLS, OHIO, U. S. A.

VAUGHN
MACHINERY
INCLUDES...

Complete cold drawing equip-
ment—continuous or single hole
for the largest bars and
tubes—For the smallest
draws—Ferrous, non-ferrous
materials or their alloys.

PRICES

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans, Domestic, 80%, per gross ton (carloads).....\$135.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....\$36.00
Domestic, 26 to 28%..... 49.50

Electric Ferrosilicon

(Per Gross Ton, Delivered Lump Size)

50% (carload lots, bulk).....\$74.50
50% (ton lots, packed)..... 87.00
75% (carload lots, bulk).....135.00
75% (ton lots, packed).....151.00

Silvery Iron

(Per Gross Ton, base 6.00 to 6.50 Si)

F.o.b. Jackson, Ohio.....\$29.50*
Buffalo30.75*
For each additional 0.50% silicon add \$1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add \$1 a ton for 0.75% phosphorus or over.
*Official OPA price established June 24, 1941.

Bessemer Ferrosilicon

Prices are \$1 a ton above Silvery Iron quotations of comparable analysis.

Ferrochrome

(Per Lb., Contained Cr, Delivered Carlots, Lump Size, on Contract)

4 to 6 carbon.....13.00c.
2 carbon19.50c.
1 carbon20.50c.
0.10 carbon22.50c.
0.06 carbon23.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

(Per Gross Ton, Delivered, Lump Size, Bulk, on Contract)

3 carbon\$113.00*
2.50 carbon 118.00*
2 carbon 123.00*
1 carbon 133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del'd carload..... \$2.00
Ferrotungsten, 100 lb. and less 2.25
Ferrovanadium, contract, per lb. contained V, del'd \$2.70 to \$2.90†
Ferrocolumbium, per lb. contained Cb, f.o.b. Niagara Falls, N. Y., ton lots..... \$2.25†
Ferrocobaltititanium, 15-18 Ti, 7-8 C, f.o.b. furnace, carload contract, net ton.....\$142.50
Ferrocobaltititanium, 17-20 Ti, 3-5 C, f.o.b. furnace, carload contract, net ton.....\$157.50
Ferrophosphorus, electric or blast furnace material, carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage freight, equalized with Rockdale, Tenn., gross ton..... \$58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., \$3 unitage, freight equalized with Nashville, gross ton..... \$75.00
Ferromolybdenum, per lb, Mo, f.o.b. furnace 95c.
Calcium molybdate, per lb. Mo., f.o.b. furnace..... 80c.
Molybdenum oxide briquettes 48-52 Mo, per lb. contained Mo, f.o.b. Langeloth, Pa.... 80c.
Molybdenum oxide, in cans, per lb. contained Mo, f.o.b. Langeloth, and Washington, Pa. 80c.

*Spot prices are \$5 per ton higher.
†Spot prices are 10c. per lb. of contained element higher.

ORES

Lake Superior Ores (51.50% Fe.)

(Delivered Lower Lake Ports)
Per Gross Ton

Old range, bessemer, 51.50.....\$4.75
Old range, non-bessemer, 51.50. 4.60
Mesaba, bessemer, 51.50..... 4.60
Mesaba, non-bessemer, 51.50... 4.45
High phosphorus, 51.50..... 4.35

Foreign Ores*

(C.A.f. Philadelphia or Baltimore, Exclusive of Duty)
Per Unit

African, 46-48 Mn.....66.5c. to 68c.
Indian, 48-50 Mn.....68c. to 70c.

Brazilian, 46-48 Mn.....67c. to 68c.
Cuban, 51 Mn.....81c.
Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered....\$24 to \$26
Tungsten, domestic scheelite, at mine\$24.00 to \$25.00
Chrome ore, lump, c.i.f. Atlantic Seaboard, per gross ton;
South African (low grade)..\$28.00
Rhodesian, 45Nom.
Rhodesian, 48Nom.

*Importations no longer readily available. Prices shown are nominal.

COKE*

Furnace

Per Net Ton

†Connellsville, prompt\$6.00

Foundry

†Connellsville, prompt..\$6.75 to \$7.00

*Maximum by-product coke prices established by OPA became effective Oct. 1, 1941. A complete schedule of the ceiling prices was published in THE IRON AGE, Sept. 25, p. 94B. Maximum beehive furnace coke prices established by OPA, Jan. 26. †F.O.B. oven.

By-product, Chicago\$12.25
By-product, New England....\$13.75
By-product, Newark..\$12.40 to \$12.95
By-product, Philadelphia\$12.38
By-product, Cleveland\$12.30
By-product, Cincinnati\$11.75
By-product, Birmingham\$8.50†
By-product, St. Louis.....\$12.02
By-product, Buffalo\$12.50

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb., gross ton.....\$40.00
Angle bars, 100 lb..... 2.70
(F.o.b. Basing Points) Per Gross Ton
Light rails (from billets).....\$40.00
Light rails (from rail steel)....39.00
Base per lb.
Cut spikes 3.00c.
Screw spikes 5.15c.
Tie plates, steel..... 2.15c.
Tie plates, Pacific Coast..... 2.30c.
Track bolts 4.75c.
Track bolts, heat treated, to railroads 5.00c.
Track bolts, jobbers discount...63-5

Basing Points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond.

FLUORSPAR

Fire Clay Brick Per Net Ton

Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail.....\$25.00
Domestic, f.o.b. Ohio River landing barges 25.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines..... 25.00
Foreign, 85% calcium fluoride, not over 5% Si, c.i.f. Atlantic ports, duty paid.....Nominal
Domestic No. 1 ground bulk, 95 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines....\$34.00
As above, in bags, f.o.b. same mines 36.40

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick Per 1000

Super-duty brick, St. Louis....\$64.60
First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois 51.30
First quality, New Jersey..... 56.00
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois 46.55
Second quality, New Jersey... 51.00
No. 1, Ohio..... 43.00
Ground fire clay, net ton..... 7.60

Silica Brick

Pennsylvania\$51.30
Chicago District 58.90
Birmingham 51.30
Silica cement, net ton (Eastern) 9.00

Chrome Brick

Per Net Ton

Standard, f.o.b. Baltimore, Plymouth Meeting and Chester...\$54.00
Chemically bonded, f.o.b. Baltimore, Plymouth Meeting and Chester, Pa. 54.00

Magnesite Brick

Standard f.o.b. Baltimore and Chester\$76.00
Chemically bonded, f.o.b. Baltimore 65.00

Grain Magnesite

Domestic, f.o.b. Baltimore and Chester in sacks (carloads)..\$44.00
Domestic, f.o.b. Chewelah, Wash. (in bulk) 22.00